



FRIDAY, MAY 14, 1880.

The Argument for State Railroad Ownership.

[Document submitted to Parliament by the Prussian Government with a bill to authorize the acquisition of several private railroads by the State.]

(Translated for the Railroad Gazette.)

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III.

DUTY OF THE GOVERNMENT WITH REGARD TO THE TECHNICAL OPERATION.

The technical working of a railroad calls for the attention and co-operation of the government no less than its construction. The dangerous nature of railroad operation has certainly been reduced to a considerable extent by the technical improvements effected during a forty years' period of development, as compared with the primitive working arrangements in vogue in earlier years, but on the other hand, a steady increase in the dangers of operation has necessarily been caused by the extension of the railroad system and the increase of traffic.

The greater amount of traffic to be accommodated, the more numerous the trains to be despatched, the shorter the intervals between succeeding trains, the more numerous the employees required to make up and despatch the trains, and the more complicated the working and station arrangements, the greater the increase in the dangers of operation. It must be admitted that the means of fulfilling the requirements of operation have been improved and perfected, but the problem of operation itself has grown more and more difficult and complicated with the increase of traffic, and a constant increase in the number of accidents may be expected. Just as the number of accidents in England and Belgium, in consequence of the extensive development of the railroad systems in those countries, is higher than in other lands, so for the same reasons the number of casualties now is greater than in earlier years. To guard against this constant and unavoidable increase in the dangers of operation, it is the duty of the government to see that all the conditions on which the safety of railroad operation depends are conscientiously fulfilled by the companies. For these reasons the projected structures of the road are subject to government examination and sanction; on this account we have government supervision of the construction of rolling stock, government control of railroad track regulations, the determination by government of the qualifications of the track-men and engine-men, the examination and approval of the time-tables, the control of the hours of service and distribution of service of the employees entrusted with guarding the road, the reports, inspections and inquiries into irregularities of trains, respecting the maintenance of the road and equipment, the establishment, provision for and condition of the reserve and renewal funds, as well as the current condition of the stock of locomotives and the work demanded of and accomplished by the various managements. Even all these rules and directions, which are intended to secure the regularity and safety of operation, fulfill their object but imperfectly when the management does not conscientiously support the government and carefully meet the requirements that are arising from constantly changing circumstances.

GOVERNMENT CARE FOR THE INTERESTS OF NATIONAL DEFENSE.

In their capacity as public carriers, the railroads are primarily designed to serve the interests of commerce and the national defense. The railroad system has shown one of its most important uses to be its furtherance of the national defense. The rapid concentration of the necessary masses of troops at any point that may be threatened by an enemy to a great extent decides the success of strategical operations. The interests of national security therefore demand that the connections of the railroad network provide for the means, first of facilitating in the different military districts the mobilization of the different contingents and their preparation for march to the seat of war with the least possible delay, and on the other hand ensure the rapid transport, to such a point as may be threatened by the enemy's army, of as many troops as may be necessary to oppose them, as the particular emergency may require. The rapidity with which the disposable troops may be concentrated frequently makes up for their deficiency in numerical strength. Of no less importance are the capacity and systematic interconnection of the railroad system for the supply and to keep up the rear communications of the army in the field, for the reinforcement of troops and war material, for the sustenance of the army and for transportation inland from the seat of war. In a country with boundaries such as inclose the German Empire, the interests of the national defense are of preponderating importance in determining the constitution and development of the railroad system. It becomes, therefore, the duty of the government, in controlling the construction and configuration of the railroad system, to provide direct military roads with a capacity adapted to any emergency of war, to arrange as systematically as possible their ramifications into all the different military districts of the various army divisions, to prepare and develop the roads for the accommodation of the utmost amount of military traffic that could in any event fall to their share, to supervise the construction of stations suitable for the shipment of troops and war materials, to see that they are kept in good condition and to provide for the possibility, if necessary, of a speedy and effectual destruction of some such structures of the more important lines as are essential to their working. Even the distribution of technical operatives of the road must be considered in their relations to the use of line in time of war, or for extensive military operations; if the force is already organized, the road may be utilized at once. The responsibility of the state for the interests of national defense thus entails a far-reaching co-operation of the government authorities that must trench considerably on the independent disposition of the managements, and which must extend its supervising, regulating and restricting influence to an equal extent over the location, construction, equipment and working arrangements of the railroads.

CARE OF THE STATE FOR COMMERCIAL INTERESTS.

Just as the railroad lines, in their capacity as public highways, form the military roads by which armies are moved, so are they the routes pursued by the currents of the world's commerce.

A large proportion of the products of the country are dependent on the railroads for means of transportation. The through railroad lines, extending beyond the borders of provinces and countries, and, in fact, almost over the whole continent, and the passage of cars, from the starting point to their destination, in the European system of railroads constructed of uniform gauge,* has extended the carrying

capacity of the railroads to the furthest limits of our continent. The possibility of exchanging goods throughout this enormous territory, regulated by the international commercial agreements supported by the connecting water-ways and the minor systems of transportation in operation in the districts bordering on the railroads, has given scope to the productive powers of the nations, opened up their natural resources and the wealth of their produce which before were unknown or unemployed, and unavailable for the growing requirements of a progressive development, and has rendered them available material for home and foreign productive power and enterprise. From the inland traffic of narrow territories, from the straitened commercial relations existing between different countries, hampered by endless difficulties and obstructions, has grown gradually the great international commerce. Inasmuch as producers are able to draw their supplies from, as well as forward their products to, the most distant quarters, the inventive and enterprising spirit of commercial life has, during the short age of the railroad, already shown results which far exceed those of centuries of activity in olden times. Countless new industries have been called into existence, the economical activity of whole nations has undergone a complete transformation, new powers have arisen, new values have been created, and many ancient and long-cherished industries have, under the changed conditions and more abundant resources of foreign competition, lost their old vitality. Unforeseen, irresistible and sudden, these changes have often been effected in such a manner as to jeopardize the economical importance, not only of the individual but of whole populations. The extent of these constantly progressive changes in economical conditions, which necessarily accompany the development of a railroad system, is still unrevealed, so that the removal of the danger arising from the transformations, which is always most threatening in the case of a people poorly supplied with natural resources, can hardly be expected at the present time. As it devolves upon the government to further the prosperous development and building up of the home trade, so it should be one of its first and most important tasks to make and keep the railroads tributary to their great destiny as high roads of commerce, for the benefit of the whole community.

It becomes, therefore, a duty on the part of the government to provide for a growing commercial intercourse by corresponding additions to the different railroads, and by ensuring their proper equipment with rolling stock. The demands arising herefrom, such, for instance, as the laying of double tracks, the reconstruction of stations, the establishment of new stations and stopping places, the construction and maintenance of connections with other roads, under certain conditions the erection of union depots for common use, as well as the supply of cars and locomotives as far as may be necessary for the sufficient accommodation of the traffic, must be enforced by the state even in the case of private corporations, if the railroads, in spite of their private ownership and administration, are to be regarded as public commercial highways. For the same reason the duty falls to the government of regulating time schedules, even in the case of private management, and the power to alter the time of existing trains, and to introduce new ones, as soon and to such an extent as the exigencies of traffic may require. The responsibility of the government for the running of trains also entails on it the duty of seeing that all arrangements necessary to effect this purpose are provided, and if not to compel their provision. That the government cannot successfully undertake all the duties we have referred to without interfering in all the branches of the management, and under certain conditions severely damaging the interests of the owners, will appear plain. On account of the considerable expense that will certainly attend the carrying out of requirements of the kind described, the maintenance of commercial interests depends to a great extent on the ability of the management, while public considerations must evidently give way to the conflicting financial interests of the corporations.

WITH REGARD TO FIXING RATES.

The most difficult and at the same time the most important task devolving on the government is with regard to the fixing of the rates of the railroads. In order that the railroads' practical monopoly of transportation may not degenerate into a system of extortion on the traffic which depends upon them, the fixing of the rates must not be left to the arbitrary will of the parties working the roads.

It is rather the business of the government to see that the use of the railroads shall be secured to all who have to do with transportation for a fixed and proper consideration. The net cost of every article produced that is not consumed in the immediate neighborhood of production consists in part of the cost of transportation. The greater the distance at which producers obtain their supplies and market their products, the larger will be the proportion of transportation charges included in the cost of production and in the selling price of the article. With the facilitation of the exchange of goods over great distances, as effected by the extension of the railroads, the whole productive economy, as we have explained above, has undergone a complete change of form, since the sources of supplies and the markets for almost every branch of productive industry have been extended far beyond the previous narrow limits. The cost of railroad freightage forms, therefore, a considerable proportion of the cost of production of most articles at present, so that the development of all the chief branches of production that are not from some cause independent of the fixing of tariff rates, is to a great extent dependent on the fixing of tariff rates.

(a.) *Moderation of the Railroad Tariffs.*—We will endeavor to show that the government has first of all the highest interest in a proper limitation of railroad tariffs. In the law regulating railroad enterprise of Nov. 3, 1838, the rates chargeable by any railroad are limited to the realization of a clear profit of 10 per cent. on the capital invested; and as soon as this profit is exceeded a reduction in the rates charged is directed (§ 33). The imperial constitution, without fixing any particular point as the limit, establishes the greatest possible reduction of the rates of transport as the problem to be solved by the railroad policy of the Empire, and only fixes the one pfennig rate* for application to the transport of those raw materials whose movement over great distances is considered one of the prime requisites for the stimulation of trade and industry, as the object first to be accomplished. (Art. 45, No. 2.)

The schedules of rates of the railroads fluctuate widely between the cost of transportation to the management, which is calculated only with difficulty and imperfectly, and the value of the transportation to the shippers.

The cost of transportation to the carrier has been enormously reduced since the initiation of railroad enterprises. The great progress in the science of operation, in the nature and construction of the rolling-stock, in the systematic and economical regulation of the operation, in the reduction and simplification of the methods of administration and operation, and especially by the great increase in the traffic, have contributed to this result. The advantage accruing to the railroads in making the carrying powers of their lines as valuable as possible to shippers has also assisted in bringing about this reduction in the tariff. These various causes will

suffice to explain the extraordinary reductions in the rates of transport which have been made on all important articles of freight since the introduction of the railroad.*

In its care for the encouragement of domestic trade, government has the liveliest interest in the reduction of general freight charges, but more particularly in the rates imposed on the least valuable rough freights which are absolutely necessary in the development of industries. This becomes all the more evident when we consider that the enormous progress of traffic which the railroad age has brought has kept pace with the gradual reductions in freight charges, as well as with the extension of the network of railroads. To ensure a proper formation and development of the railroad system, it is, therefore, absolutely necessary that the government be assured of a continuance of the reduction in tariff rates, sufficient to meet the economical requirements of the country. The principle of railroad policy, expressed in the before-mentioned Art. 44, No. 2, of the imperial constitution, is, therefore, founded on the proper appreciation of an unavoidable necessity. The designation of the one pfennig tariff as the normal rate which it was desirable to attain for that class of bulky merchandise which is indispensable to economical interests is the concrete expression of the opinion, that the movement of these substances over a widespread territory is the fundamental requirement for the advancement of industry and the development of the natural resources of the country. In consequence of the extraordinary difficulty attending the acquisition by government of the means necessary to reduce the rates of transport, the principle included in Art. 33 of the constitution has never been consummated. Aside from the reductions of rates, necessitated by the adoption of through shipments, and the famine rates, a compulsory reduction of the freight charges by the state is attended with difficulties which can scarcely be surmounted. It entails a weighty and direct attack, not only on the management, but also on the financial interests of the corporations concerned. On the other hand, to render this action of the government subordinate to the financial interests of the different corporations, would not only contradict its object, but also would be inflicting an injury on those districts which are dependent for their means of transport on a financially embarrassed railroad. If the reduction of the tariff is left to the free action of the railroad companies, it becomes a question not of the interests of trade, but of the financial interests of the railroads, and the freight rates charged will be subject to the complaints on the part of the commercial world that have been prevalent for many years, respecting the instability, inequality and complication of the rates.

(b.) *Stability and Uniformity of the Tariffs.*—Just as much as the moderation of the railroad tariff is an important consideration to the successful development of the commercial system, so are their stability and equality. So far as they are not excluded by the former. The equalization of distance effected by all means of communication, by which the producing and consuming districts are brought more closely together, is in the case of railroad transport possessed of increased importance, because the amount of traffic on the railroads, which is of the first importance in determining their rates, depends not only upon the quantity carried, but on the length of the haul. Not in the number of tons carried, but rather in the number of tons carried one mile (tonnage-mileage), is the amount of the freight traffic of a railroad properly expressed. Therefore, the reduction of rates for long distances is for the interest of the railroads, just as is a similar reduction for the coarse freights, whose carriage enables them to utilize to the utmost their cars and motive power. Were their manipulation of the tariffs unrestricted, it would lead to a still more varied system of rates, according as the above considerations should have greater or less application. In addition to what we have already mentioned, it must be remembered that the currents of traffic generally are limited to certain directions—the direct lines between consuming and producing districts. The number of lines competing for the carriage of this traffic, however, has been enormously increased, as the railroad system has been extended, by the combination of connecting roads for use as through lines. The further apart the termini of the route are situated, the greater the number of competing lines between them; and this number is further increased by the water-roads, especially for the traffic to and from sea-ports. With the large, and in consequence of the constant extension of the railroad system, continually increasing number of competing routes in those directions in which the currents of the world's commerce move, a constant variation in the tariff is inseparable from the continually changing interests of the different managements forming the separate lines. So long and to such an extent as is demanded by the interests of competition, and as long as the customary understanding between them does not occur, the rates will be reduced; but whenever these conditions are fulfilled, they will remain at their original height. This unequal and variable form of the tariff, in consequence of the importance of the railroad freight charge to the cost of the production of goods, is a constant and serious danger threatening every branch of industry. Under the influence of a tariff which owes its existence to a fortuitous concurrence of events, we find that in one neighborhood new industries and new works are called into existence, while at another point, a formerly flourishing industry is practically killed. These variations occur most frequently on the long routes of transportation extending over the borders, and here not only do the conditions at home, but also those of the foreign country, affect the competition of the carriers. The construction of new lines and short routes at home and abroad, the consolidations and operating agreements of the managements, the changes in the schedule rates of foreign railroads, the justifiable and, unfortunately, oftener unjustifiable, competitive measures of the foreign forwarding lines, the constant changes in the conditions of water competition, the rise and fall of ocean freights, the establishment of new steamer lines, as well as the withdrawal or changes of those existing, changes in the customs laws, political entanglements with their restrictions of traffic and their effect on the money market, epidemics and all imaginable events that interrupt commerce—in short, countless unexpected and unforeseen circumstances exercise a constant effect on the railroads and conditions of transportation. They change and disarrange the competing interests of the different companies, transfer business from one route to another and cause a change of relations which finds expression in a constant variation and change of the freight rates on the different routes. Although it must be admitted that these conditions, as far as they originate in the state of affairs abroad, are to a great extent beyond the reach of the home government, it still remains desirable, in order to secure a constant and regular commercial progress, to neutralize their evil effects as far as possible by the establishment of a well-regulated tariff on the home railroads, and at least to guard against the dangers and disadvantages to commercial development caused by an arbitrary system of rates determined chiefly by competition, abandoning the system by which the variation and instability of the prices for

* That is, one pfennig (0.243 cent) per centner (110 lbs.), per German mile (4.68 English miles). This is equivalent to 0.935 cent per ton (of 2,000 lbs.) per English mile.—TRANSLATOR.

* Spain and Russia have not the standard gauge.—TRANSLATOR.

* Appendix 7 contains the tariff rates for a number of articles of commerce as they have appeared at intervals of five years since 1848, in order to give a distinct idea of the reduction of prices that have taken place.

transportation are increased. It is therefore incumbent on the state to subject the making of exceptional rates to its supervision and control, and to permit those only which appear desirable in the interest of the development of traffic and the industrial resources of the country, and rigidly to exclude all that flagrantly transgress against the regularity of the tariff, or that are disadvantageous to those commercial interests it has undertaken to protect.

The experience of recent times shows that a settled schedule of freight charges, and one not subject to arbitrary and frequent fluctuations, is most advantageous for the substantial and regular development of commerce. Only by this means can a safe and trustworthy foundation be given for business combinations, and the conduct of those industrial undertakings that are dependent upon the railroads. The assumption that reductions in freight charges are to be accepted as everywhere desirable and permissible, if they suit the interests of the shipper and the railroad alike, is not to be accepted as universally true. Most of the reductions in rates that have been allowed on the intercession of certain commercial interests, are, as a rule, accompanied not only by advantage to those business relations that are suited to these arrangements, but also by disadvantage to those who conduct a competing business dependent upon the same district for a market but which cannot take advantage of the special reduction of rates made for the benefit of their competitors. Under these circumstances, the effects of reduced tariff arrangements can be foreseen neither by the railroad managements nor by the government supervising officials, as the commercial relations of the different shippers, the conditions of production and the limits of the markets supplied by the different producers cannot be exactly known by them. It has repeatedly happened that exceptional rates of this description, which had been granted at the urgent request of the shippers and also in the interests of the railroads, immediately afterward have become the subject of earnest and justifiable complaints on the part of competing producers, who found their market not only opened, in consequence of the reduced rates, to outside competition, but sometimes completely closed to their own trade.

It is therefore evident that by such variations in the rates of transportation, the conditions of existence may be withdrawn from an established industry, just as they may be given to a new industry. From all these reflections the thought arises, whether it will suffice for any length of time to make the supervisory officials responsible for the allowance of such exceptional rates, whether these supervising officials themselves have the information at their command that will enable them rightly to estimate the ultimate effects of such rates, their advantages and disadvantages to industrial life, and to weigh and consider them, or whether it appears more advantageous, in place of such an adjustment of rates, made according to the requirements of commerce in the many different parts of the country and branches of industry, and comprising numerous exceptional rates to suit a changing and motley variety of conditions, to provide a permanent and uniform foundation for the rates of railroads and have it fixed by law. The establishment of such a standard, to the exclusion of all arbitrary fluctuations and unexpected disturbances, whether it be established by fixing the rates by law or otherwise, would be of the greatest importance to the development of commerce, as without it the constant and widely differing changes that business relations undergo cause continual changes in the form and arrangements of the tariff, and thereby unavoidably lead to the uncertainty and complication, by which the certain calculation of freights is rendered difficult or impossible and one of the most important considerations of business intercourse is left questionable.

Whether the action of the state be confined to the passive exclusion of all such arbitrary tariffs as jeopardise commercial prosperity, or whether it appears indispensable to fix by law a positive uniform standard for making the rates, in either case the protection of the public interests, which is vested in the government, demands a restriction of the functions of an independent administration, of such deep and far-reaching importance as to seem hardly compatible with the independence of the private operation of railroads.

(c) *With Regard to Customs Policy.*—The determination of the tariff acquires an increased significance for public interests by the close connection which its effect on foreign commerce has with the customs policy of the country. The industrial crisis, which, in consequence of unlimited overproduction in all branches of manufacturing industry, has compelled this and foreign countries to restrict the production of manufactures and bring it down to the level of the actual demand, is naturally fraught with the greatest danger to the weaker manufacturers. In the underbidding of prices, often below the cost of production, the struggle for existence is carried on, by which in the competition of nations, as of individuals, the weaker go to the ground. Although it is perfectly true that over-production can only be cured by its restriction, still it appears to be the most urgent and indispensable duty of the government to see that the restriction does not affect domestic production solely or unduly. If, then, the state must assist the latter in this struggle and lend its protection, so much the more and the more certainly is it its duty in the further development and building up of commerce to prevent whatever might restrict or hinder the competition of home against foreign industries. Such a hindrance, and one of most deadly effect, consists in railroad rates arranged to favor foreign products as against home manufactures. The favor shown foreign products, in the so-called foreign differential rates, has no close connection with the provision of goods from abroad, but is rather chiefly the natural consequence of the function of the railroads in equalizing distances, of the circumstance that the foreign transport route is generally longer than the road to and from the domestic competing districts, that with the length of the route the number of competing connections increases, and that in this trade the circumstances are subject to the most rapid and frequent changes. If, then, the railroads are inclined, in their own interests, to reduce the rates for the export and import of foreign products, it is the duty of the government to take measures restricting this tendency, and in proportion as the home industrial interests are liable to suffer, to hinder it, so that the domestic market may not be exposed to a ruinous flood of goods which are the result of over-production abroad. Repressive measures against such an arrangement of rates become, therefore, chiefly the consequences of a healthy and justifiable national self-regard. Still more are these regulations necessary, when the depressed state of home manufactures demands the direct protection of the government, by the imposition of a protective duty on foreign products. If the right of government to protect home manufactures against foreign competition by the imposition of a protective duty is recognized as justifiable, how much more is it justifiable for government to ensure the effectiveness of this protection by preventing any neutralization of these restrictions by the adoption of lower freight rates on imports. The assurance of this protection has become not merely a question of arbitrary consideration as to whether the tariff in individual cases is injurious to domestic production; it becomes a positive duty to prevent the avoidance or reduction of a protective duty on foreign manufactures by a reduction in charges on dutiable foreign freight. It especially devolves upon the government, in such a case, to protect the customs

policy against a railroad tariff that is mainly determined by the pecuniary interests of the road. Such a restriction, trenching as it does so considerably on the interests and the free action of the railroad corporations, will not be so surprising when we consider that railroads, as public highways, can only be left to unrestricted private control so far as public interests permit; and that a policy of protective customs duties, which has been demanded and sanctioned by law as essential to the most important public interests, justifies all such interference with the operation and management of a railroad as may be necessary in order to carry it out successfully. Whether on the one hand such limitations are consistent with the existence of an independent private system of railroad operation, or whether on the other hand the government will be in a position to prevent effectually any selfish encouragement of transportation business on the part of the railroads in contravention of the protective tariff policy, are questions that must be left to futurity for a decision.

(d) *Uniform Treatment of Shippers.*—If the right to the exclusive conduct of transportation over his road granted to the constructor of a railroad should be united with the condition that it shall open for the use of the whole community, as the nature of a public highway requires, then its use must be secured to everybody on equal terms. In the price of transportation, as well as in the other terms of transportation, no difference between individual shippers, no preference of one before another, can be permitted; either would be inconsistent with the fundamental principles of a well ordered state, which guarantee equal rights to all. This principle of equality does not, it is true, absolutely exclude those favorable conditions of transportation or reductions in rates that may be made for fixed considerations, such as the quantity shipped, the length of the haul, or other requirements, as long as they are guaranteed alike to everybody who complies with the before-mentioned requirements and conditions. Such a regulation of these requirements and conditions as would allow of their definite statement, in order to secure to one shipper the privileges granted to another, would be practically impossible, but although they may not be formally expressed, they must be founded on facts. The just and equitable treatment of all shippers demands at the same time the publication of all rates and conditions of transportation, so that they may be known and available to all. The principle of the publicity of the rates and the equal treatment of all shippers, (§§ 26 and 32 of the law of Nov. 3, 1838), which are embodied in the railroad legislation of all countries, are, as experience has shown, to be circumvented on account of the competing interests of railroads, and also by individual interests which have influence with the managements. The granting of these secret advantages in transportation in the most diversified ways to individual shippers, and in particular the so-called rebate system, is the most injurious misuse of the powers granted to railroad corporations. It renders government control of the rates impossible, makes the competition between the different lines, as well as that of the shippers dependent on them, dishonorable and unfair, carries corruption among the railroad employees and leads more and more to the subordination of the railroad management to the special interests of certain powerful cliques. It is the duty of the government to oppose this evil, to uphold the principle of the equal treatment of all shippers, and to enforce the legislative regulations on this subject. The importance of this problem is only equalled by the difficulty of its solution.

IV.

DIFFERENT FORMS OF RAILROAD DEVELOPMENT.

According to the above deductions, no doubt can remain that it is the duty of every rational railroad policy to discover the best means and ways to accomplish:

1.—On one hand, the uniformity of the railroad system, as required by its development, and the gradual concentration of the administrative and working systems.

2.—On the other hand, to protect and advance the public interests that are affected by construction, operation and direction during their progressive development and unification.

This being the case, the question will naturally arise, which of the different forms that the railroad system assumes during the period of its development is most favorable for the accomplishment of the problems of railroad policy? These forms, of each of which a representative may be found in the railroad systems of modern civilized countries, are:

1. Private ownership and private operation of the railroad.
2. Government ownership and private operation.
3. Private ownership and government operation.
4. Government ownership and operation.

In the first two forms, the efforts of the government to attain its objects must be indirect, as state supervision over private enterprise obstructs and restricts the latter. The supervision exercised by the state is in the first case chiefly dependent on the laws and charters granted, while it is strengthened in the second place by the owner's reservations. In the two last-named forms (3 and 4), the control of the government is direct, for, in place of private enterprise, we have the action of the government. In the third case, this latter action is hampered by the private proprietorship; in the fourth case it is unlimited.

PRIVATE RAILROADS UNDER THEIR OWN MANAGEMENT.

1. The pure private railroad system, that is, the union of ownership and operation in the hands of a private enterprise, presents the most difficulties and hindrances to the fulfillment of the government's objects in the development of the railroad system.

Uniformity in the construction, administration and operation of railroads, though it may be conceived without complete unity of ownership and operation, can, in consequence of the individual interests of the different companies, be realized only to a very limited extent. A systematic construction of the railroad network, without due consideration of the ownership relations, is impossible. The latter, in the case of an arrangement of the different lines so as to work together in such a manner as to further commerce, necessitates a configuration that will materially differ from the configuration of the whole network produced where there is complete unity of ownership and management, because it must provide for the maintenance of the independence and the ability to compete on the part of every management. A systematic partition of the railroad districts among the corporations, if carried out with this object in view, although it might meet all the requirements of commerce, would still retain all the disadvantages and entail all the loss to the community that is consequent on competitive building and competitive operation. Uniform standards for the building of the railroads and the construction of the rolling-stock are of comparatively little value, as they can only be regarded as guiding and regulating the future construction and equipment of railroads. To come into general use, they would require a complete period of renewals, and during that time, the technical progress made would probably cause them to be superseded. Not less difficult is the establishment of harmonious working regulations among the different roads under private management. Only where the disadvantages to some lines are balanced by the advantages accruing to others—that is,

where all the lines are under one management—are uniform working regulations possible without injury to the interests of the owners. The introduction among the German railroads of a tariff uniform, in system and principle, at least, has only been accomplished with extraordinary difficulty, and many modifications and restrictions to protect the special interests of the different managements. Again, the effort to establish within a narrower district uniform regulations, insuring direct transport and through trains for certain transport routes, has encountered the greatest imaginable hindrance and difficulty, chiefly on account of the diverging, and often utterly mistaken interests of the different administrations. Several of the through and connecting trains now running for the accommodation of passenger traffic on the more important routes were originally introduced, in spite of the opposition of some of the railroads concerned, by compulsory measures. It occurs occasionally, even at the present time, that the introduction of certain trains over routes formed by the connecting lines of several different roads is opposed by some of the roads over which they run, either for the reason that it does not pay the line complaining, or because the interests of the owners would be better served by the development of traffic over some competing line. In cases of this kind, even where it is possible to break up the opposition by means of compulsory measures, the discussion whether and to what extent private are to be sacrificed to public interests becomes a delicate and troublesome subject.

On the other hand, the union of all domestic railroads in the hands of one private enterprise would be absolutely inadmissible. Although the disadvantages and dangers of an unsystematic division and wasteful competition would thus be avoided, to place the complete monopoly of all means of transport in the hands of one enormous profit-seeking corporation would be antagonistic to every public interest concerned, as will be apparent to all. Already in those countries where private railroad management is the rule, and where the technically and economically justified process of absorption by the powerful corporations of the smaller and less important railroads prevails, their course hitherto, the dangerous influence which these powerful corporations have acquired over the whole public existence, the reckless pursuit of the profits of their monopoly and their chartered rights within the district they serve, and the impotency of government supervision compared with their far-reaching, well organized power, controlling all interests, together cause the gravest apprehensions for the welfare of the country, and even for its political independence. A remedy is there naturally sought for, and can only be obtained in the form of an acquisition of the railroads for government.

It will be readily realized, after what we have urged, that the simple private ownership of railroads is not the system of development most favorable to the plan of uniformity of railroads, nor is it likely to advance the gradual concentration of the systems of administration and operation. But it appears much more serious in its effects, and quite impossible as a permanency, if we consider the further duty of the government, the protection and advancement of all public interests that are affected by the railroads.

The only means at the disposal of government to fulfill this purpose is the right of supervision, secured by laws passed and in return for chartered privileges. The problem of railroad legislation, in the presence of a powerful and rapidly-growing phenomenon, has naturally received but a very unsatisfactory solution. The importance and peculiar nature of this phenomenon has been only imperfectly recognized and appreciated, so that the laws dating from the first period of development, in spite of the most careful preparation, stand out like ruins in the present times. The railroad law of Nov. 3, 1838, the best recommendation of which is that it has remained in force until the present time, is also found to be far behind modern requirements. A part of the provisions it embodies (§§ 27 to 31, 33, 42) have never been of any practical utility, the hypothesis and assumption on which they were grounded having been found not to agree with actual conditions; another portion (§§ 2, 3, 8 to 19, 25, 36 to 41, and 44) has been superseded by later legislative action; the remaining part has proved so utterly inadequate for the legal regulation of the railroads, that already the scant regulations contained in section VII. of the imperial constitution, by means of which the duties that fall upon the railroads with relation to general traffic and the interests of national security were first fixed provisionally, have appreciably assisted in filling the gap in the existing railroad legislation. If we compare the task of the government with regard to the furtherance and protection of public interests, as specified in our third section, with the powers granted by the present laws, it will be at once apparent that the latter are totally insufficient for the purpose. Is the government justified, whether in the interests of safety and regularity of operation, or in the interests of commerce, or of national safety, in demanding changes in and additions to the plans of construction, the rebuilding of depots, the construction of new stations and stopping-places, the laying of double tracks, the removal of level crossings or the alteration of the existing rolling-stock? Some of these powers are in reality claimed by the government on the strength of the general purport of § 24 of the railroad law and the rights of supervision guaranteed in § 46; but the exercise of these rights is disputed by the railroad administrations. In consequence of this want of a sufficiently certain and clear legal title on which to base its assumption of the power claimed, government has been obliged to confine itself to the application of compulsory measures only in the most flagrant cases of necessity. It was left to the later development of railroads and the business dependent on them, to demonstrate the pressing necessity of such powers to the supervising authority. That a legislative reform, for the purpose of regulating and determining these powers, must meet with the bitterest opposition on the part of the opposing interests of the railroads, the experience of the past few years has abundantly demonstrated; and even if such a reform measure were attainable, it would, as far as can be realized, only temporarily suffice for these necessities. Just as the fate of earlier legislation was to be distanced by progressive development, so will it be sooner or later with all future laws. The technical progress made in the building and operation of railroads as well as in the construction of the rolling-stock and working arrangements, the changes in business relations in consequence of the growing extension of the railroad system and of the exchanges of merchandise between districts and nations, the short-lived innovations and rapid transformations by which the progress and development of the railroad system is accompanied, will always offer obstacles to government regulation that are to a certain extent inseparable from an unsettled state of conditions and relations in course of development. In proportion as the existing laws prove themselves insufficient for present requirements in securing to government the authority that public interests require, they must be corrected through the conditions and privileges granted in the case of new undertakings; and we see the results of this constant struggle for reform in the increased complication and more comprehensive nature of the conditions under which charters are granted. As the legal privileges of the existing railroad companies, as fixed by previous concessions and stipulations, cannot be altered to their disadvantage with-

out compensation (§ 49 of the railroad law), the conditions under which concessions have been made for their later extension are, as a rule, only applicable to the old lines when further conditions have been imposed on the application for further privileges. The result of such a piece-meal and incomplete regulation is the creation of an unequal, complicated and difficult legal position of the different administrations in their relations to the supervisory powers of the government, and an increase in the difficulty accompanying thorough-going regulations on the part of the latter.

Even if it were possible, by means of a legal reform that could break through the legal rights of the different corporations as they at present stand, to secure such state supervision of railroads as would satisfy present requirements, the application of such a law would still fall short of the requirements of public interests. The proper character of the lines as public highways, the achievement of their functions as institutions of public utility—and only on these grounds are they granted the powers of eminent domain—demands the subordination of the private interests of the party working the road to the public interests affected. The exercise, by the state, of its right of supervision must be accompanied, therefore, by a constant conflict between public and private interests, and is in many cases impossible without serious financial injury to the latter. From the practical exercise of this right of control arise endless hindrances and hardships.

In authorizing railroad enterprises, the government is responsible that only on account of such undertakings as are of evident importance to the interests of commerce and national security shall the national capital be employed, and such an extensive trespass on private rights and the economical condition of the districts affected as is entailed by the exercise of the powers of appropriation of property, be permitted. The preservation of the independence and competitive ability of the existing private railroads frequently demanded the addition of such lines and connections as could be dispensed with in the case of a united management and operation. The question here arises, whether the authorization of such extensions appears justifiable. If in one case we give an affirmative answer, the country must bear the burden of the consequent injurious effects on its economy; if our answer is negative, the development of the private enterprise whose interests demand the addition may be restricted or compromised.

With regard to construction, it rests with the state to fix the amount of capital and control the mode of raising it, so that on the one hand the undertaking may not be burdened with an excessive mortgage and loan capital that would tend to exhaust its credit, and on the other the provision of the means necessary to secure the proper construction and equipment of the road may be ensured. The experiences of the period of the projection of railroads has proved how difficult it is to solve the problem. By means of the ever varying methods of secretly evading the regulations established by law, a number of enterprises without credit have arisen, accompanied by an enormous waste of capital, through the establishment of which the welfare of the country has been considerably injured.

The government supervision of the systematic and prescribed execution of the construction of private railroads does not by any means always afford the necessary protection to public interests. Although it may be possible to prevent the execution of the construction contrary to the approved plans, and to compel the completion of the road and its equipment in accordance with those plans, yet the exercise of such compulsion would not infrequently be accompanied by financial ruin to the parties who have undertaken the scheme, and at the same time often inflict great damage on important public interests, and so become practically impossible. The experience of the last few years has unfortunately furnished frequent proof of the correctness of this assertion. None of the independent corporations chartered in the "railroad project" years have been able, with the means of construction at their command, to complete their construction according to the approved plans and specifications. Many sought and obtained the assistance of the government, the total exhaustion of their credit, as well as their means, leaving no other method open. Others have contrived at great sacrifice to obtain the means to get their lines into condition fit to be worked provisionally, leaving the complete construction to the chance of future favorable growth of the profits of their enterprise. Had the government insisted on the fulfillment of all the required conditions and opposed the opening of the road under any other circumstances (§ 22 of the Railroad Law), the collapse of those undertakings would have been unavoidable, and the non-opening of the road for traffic at the appointed time would have caused serious injury to the whole business district dependent on that particular road and have given rise to loud complaints and accusations.

To a similar extent the requirements made by supervisory authorities in the matter of maintaining a proper condition of the road and transport arrangements after the line has been opened for traffic, either in consequence of their having been undertaken by incapable managers, or because the road has not shown the expected returns, on account of the opposing interests of the railroad companies meet with active opposition on the part of the latter, which is only overcome with difficulty. Here, too, by the exercise of their authority the action of the supervising officials may seriously affect the financial standing of the enterprise; for instance, they may order the rebuilding of stations, the removal of level crossings, the laying of a second track or the erection of new depots and stopping-places. Orders of this kind are made more troublesome and more serious to the supervising authorities as the question of their necessity, whether regarded from the standpoint of requirements of traffic, or of the regularity and security of operation, or of the protection of the interests of national defense, is often capable of very different opinions, and they are chiefly dependent upon the arbitrary estimate of the supervising officials. The various and important public interests that are affected in the operation of a railroad, demand, according to our third section, the restriction to a certain extent of the free powers of administering the railroads. The compulsory introduction of profitless trains to effect such communications as may be essential to commerce, the requirement to arrange for through shipments, which may be opposed to the interests of the roads affected, the manifold restrictions imposed on the rates which are found requisite to protect the interests of commerce, to foster home industries, and on behalf of the customs policy of the government, will often be the cause of serious losses to the separate private enterprises.

Even if we were unable to find, in all the phases we have described, sufficient grounds for interference on behalf of public interests, we may still affirm that the constant collisions with the opposing interests of private administrations are the source of constant efforts on their part to evade or violate the restrictions placed on the method of conducting traffic that best suits their wishes and interests, and are an infallible sign of an unhealthy and, for a permanency, an insufferable state of affairs. The untenability of such a system is still more conclusively shown in the inability of the government regulating authorities, with the powers of compulsion at their command, to prevent, for any length of time, the evasion by the companies of such restrictions and

regulations as they consider to be opposed to their interests in the conduct of traffic.

(TO BE CONTINUED.)

MASTER MECHANICS' ASSOCIATION.

Thirteenth Annual Convention.

The Convention assembled at Cleveland, O., May 11. The proceedings were opened with prayer by the Rev. Mr. Pomeroy.

Mayor Herrick, of Cleveland, welcomed the delegates in an appropriate address.

The roll being called, the following members answered: H. Anderson, J. M. Boon, John Black, John Bissett, R. H. Briggs, N. E. Chapman, S. M. Cummings, H. L. Cooper, John F. Crockett, Allen Cook, Jas. Eckford, W. A. Foster, Jas. J. Gordon, S. J. Hayes, S. A. Hodgman, F. G. Kaufholz, J. N. Lauder, John Orrton, M. M. Pendleton, Geo. Richards, James Sedgley, A. J. Sanborn, W. H. Stearns, H. N. Sprague, W. J. Steele, W. F. Turrell, W. Woodcock, Philip White, E. H. Williams, L. S. Young, M. N. Forney, J. O. D. Lilly, J. H. Raymond.

The following new members signed the constitution: Robert B. Small, International & Great Northern.

B. J. Sifton, Selma, Rome & Dalton.
Wm. Swanson, Jeffersonville, Madison & Indianapolis.
Geo. C. Watrous, Delaware, Lackawanna & Western.
Thos. B. Twombly, Chicago, Rock Island & Pacific.

A. R. McAlpine, Cleveland, Columbus, Cincinnati & Indianapolis.
W. Spittle, Valley, of Ohio.

Chas. T. Parry, Baldwin Locomotive Works.
H. D. Gordon, Philadelphia, Wilmington & Baltimore.
President Chapman then delivered his annual address, as follows:

FRIENDS AND FELLOW MEMBERS: It is a pleasure and privilege to meet you in this city, where, thirteen years ago, we held an initial meeting with a membership of forty at our adjournment. At present we number 180. Many have joined our association and served with us during their experience as master mechanics; many have left the ranks for other business; some have assumed the duties of higher positions; others, and I am happy to say the number is not great, have gone before us to the untimely future. Most, if not all, have left a good record behind them. As the names of those who have left us voluntarily have been dropped from the roll their places have been taken by others, who, in many instances, filled the position on the road thus made vacant.

We feel justly, perhaps, that we have done some good to our profession. I for one must say I have been greatly benefited by my connection with the association. The social features of our meetings are all very pleasant, and I think we are all benefited thereby. Speaking of the social features of our gatherings, I would like to remind our members that, although this is a great factor in the continued life and usefulness of our organization, still there is something else, for those of our members who are not so socially inclined as the rest of us it is the only point worthy of consideration. I mean the benefit to be gained to our profession through our organization. It has seemed to me that for the past few years there was not as much interest taken as there should be by a large portion, and, perhaps, a majority of our membership in both the before-mentioned features, and as a result both classes of our members are getting to think that they are paying too dear for the benefit gained.

The point I wish to impress on you is this: We meet to benefit each other in our profession, and although through adverse circumstances we may not be able to carry out the improvements and changes suggested, yet we lose nothing by knowing of them. At our last meeting we were congratulating ourselves upon the prospect of better times, which then seemed at hand. They came more suddenly and generally than the most sanguine of us dared to hope, and as part of the better times came an increased price or value on every commodity. It became evident soon after the revival in trade commenced that iron was advancing far beyond its actual value, and was radically taking everything with it in its upward strides; that something must occur to cut off the purely speculative portion of the advanced prices to prevent as sudden and ruinous a collapse and panic as followed 1873.

With the enormously advanced speculative prices which prevailed in iron, came the importation of such vast quantities as seriously threaten the entire iron industry of this country, but just when the danger was the greatest, the men of forethought and nerve, who should have controlled the iron market from the first, came to the front and cut off the speculative prices of iron, and restored the market to a firmer condition.

I trust they may not lose their grip. With the advance in iron and other commodities came the advance of wages to a large part of the laboring population, and in fulfillment of their promise of 1877 the majority of the railroads have now advanced or restored the rates to those of 1877 or previous to the last reduction. Let us hope the prosperous times may continue, which, with abundant crops the coming season, would be almost assured, and that labor and capital may work in unison. I am informed by our Secretary that death, the great leveler, has invaded our ranks the past year and the number of our membership is reduced by the loss of two members, John Marshall and J. B. Wilson. I hope a suitable expression will be made by the association in regard to the sad event.

For a statement of the financial condition of the association I refer you to the very able and satisfactory report of your Secretary.

Thanking you, gentlemen, for your attention, we will proceed to the next business in order, which is the Secretary's report.

The Secretary then read his annual report, the substance of which was as follows: Number of members at last meeting, 161; new members, 21; died, 2; resigned, 1; leaving present membership 180. Twelve hundred copies of the annual report were printed and distributed. The total receipts of the year were \$1,562. The Boston fund, with accrued interest, now amounts to \$3,853.31.

The Treasurer's report shows a balance on hand of \$641.42 from current receipts. A Financial Committee was appointed to audit these reports.

The report of the Committee on Boilers (published in full elsewhere) was then read.

The Secretary then read the report of a committee appointed at the last convention to look into the subject of the comparative performance of locomotives, with regard to economy in their operation. The report was statistical in its character, and very elaborate. It was briefly discussed, but full consideration was postponed until Wednesday morning.

A recess was here taken for ten minutes, and when the convention was called to order a "question drawer" was opened. The following questions were discussed at length:

"What is the best manner of annealing steel sheets after flanging?"

"Is button boiler riveting reliable and practicable in boiler construction?"

After the discussion of minor business an adjournment was made for dinner.

The afternoon session was occupied chiefly with the reading and discussion of the report of the Committee on the best means of preventing smoke from locomotives, with due regard to economy in fuel. This report is published in full elsewhere.

The programme arranged by the Reception Committee for the entertainment of members is as follows: Tuesday, visits to the Chisholm Rolling Mill, the Chisholm Steel Shovel Works and the Union Steel Screw Works; Wednesday, visits to the works of the Otis Iron & Steel Co. and the Standard Oil Co., and in the evening, May Festival; Thursday, carriage drive around the city and lunch at the Euclid Avenue House.

The telegraphic report says that the second day's session was chiefly devoted to technical discussions on mechanical topics. Jacob Johann, of the Wabash, St. Louis & Pacific, read an able paper on the superiority of straight-top locomotive boilers. Under the amendment to the constitution, Messrs. S. A. Hodgman, Jacob Johann, and James M. Boon were appointed to serve one, two, and three years respectively as a committee to report at conventions topics for consideration by committees during the interim, to be reported on and discussed at the next annual meeting. The topics adopted for discussion at the next convention are "Boiler Construction and Improvement," "Shop Tools and Machinery for Manufacturing and Repairing Locomotives," "Best Means of Attaining Higher Economy in Use of Bituminous Coal," and "Best Form of Construction of Locomotives for Fast Passenger Service." In the afternoon the members visited the Standard Oil Works and the Otis Iron and Steel Works. The convention was expected to adjourn May 13.

Locomotive Boilers.

(Report of Committee on Boilers to the American Railway Master Mechanics' Association at the Thirteenth Annual Convention.)

Gentlemen: At your last convention, held in the city of Cincinnati, May 13, 14 and 15, 1879, the committee on Boilers was continued with the request that they report to the convention at its next annual meeting on any matter of boiler construction or proportions that they might deem of sufficient interest to bring to the notice of the convention not heretofore reported on.

Your committee held a meeting in the city of Chicago, Jan. 14, 1880, at which all the members were present except Mr. Johann. After a general interchange of opinion by the different members of the committee, and also of several other members of our association who were present, it was concluded that as the subject of locomotive boilers had been presented to the convention at each annual meeting for the past four or five years in lengthy reports, that as a committee we would not attempt to make an elaborate report, such as had been made heretofore, but would leave each member of the Association, by a paper or otherwise, to present their views on the subject of boilers to the convention, as might seem desirable. Your Chairman of Committee was, however, directed to obtain further information in regard to the pattern of boiler known as the "Verderber" boiler, to which your committee alluded in their report to the twelfth annual convention.

It will be remembered that Mr. Stefan Verderber, Inspector-in-Chief of the Hungarian state railways, designed a pattern of locomotive boiler, in which the water spaces around the fire-box are dispensed with—the sides, back and top of the fire-box being composed of fire-brick; the tube-sheet and a few inches of the cylinder part of the boiler alone being exposed to the direct action of the heat generated in the fire-box. The tube surface being the medium through which the heat generated in the fire-box is extracted from the hot gases as they pass through on their way to the smoke-box.

By the kindness of Mr. M. N. Forney, of the *Railroad Gazette*, the chairman of your committee is informed that Mr. Verderber has made further trials with his form of boiler during the past year; the results, as stated by him, are in substance as follows:

Engine No. 104 (the trials of which were published in the *Railroad Gazette* a few months ago). After eight months' service, the boiler was found to be defective and in bad condition at the part projecting into the fire-box at the bottom of the tube-sheet, owing to sediment settling at that point and sheets becoming over-heated and burned. The tube-sheet of this engine, and also that of another of the same pattern of boiler, gave trouble from leakage, owing, doubtless, to the intense heat of the gases passing into the tubes and the comparatively small proportion of the metal in contact with water. These engines were fitted with copper tubes.

Another engine with this form of boiler, but fitted with a bridge in front of the tube-sheet similar to the brick arch, has been in service for seven months past and has so far given no trouble from leakage of tubes or other defect. Mr. Verderber does not give the results of fuel consumed and work done with this form of boiler as compared with the common form of locomotive boiler.

The inference which your Committee draws from the reports of the Verderber boiler is that it has not yet been perfected sufficiently to warrant a series of close tests to determine as to whether, on the whole, that form of boiler is superior to the common form or not, or whether it is even equal to it. It would seem to us that the intense heat generated in a fire-box composed of fire-brick must prove very destructive to the tube-sheets and ends of the tubes, with a draft such as is necessary in the boiler of a locomotive.

We have nothing further to offer as a report. With the chairman of your committee the demands of business have been such that it was out of the question for him to give this subject any time in the matter of compiling a report, and on that account he requests your indulgence, trusting that all matters bearing on the subject referred to the committee may be fully discussed in open convention with better and more satisfactory results than he could have disposed of them in a formal report.

Respectfully submitted, R. WELLS, Chairman.
Supt. Machinery L. & N. Railroad.

A Wayside Story.

"Once over these boundless prairies," the sad passenger said, "over these prairies—" "They call them 'prairies' over in Indiana," the fat passenger said. "And down in Illinois," said the cross passenger, "they call them 'peraries.'" "And up in Michigan," the brakeman said, "they call them 'pairs.'" "And down in Kentucky," the man on the woodbox remarked, "they call them 'perars.'" "Well, anyhow," the sad passenger resumed, "once over these plains—" "You said 'prairies' before," said the passenger with the sandy goatee. "Yes, and started a very profound philological discussion by it. Well, once over these verdant prairies—" "The first time," said the cross passenger, "you said 'boundless prairies.'" "Well, then over these boundless prairies once—" "Only once?" asked the fat passenger. The sad passenger sighed, but went on: "Once the painted Indian roamed—" "What for?" croaked the woman who talks bass. And the sad passenger said he would tell that story yet if he had to hire a hall to tell it in.

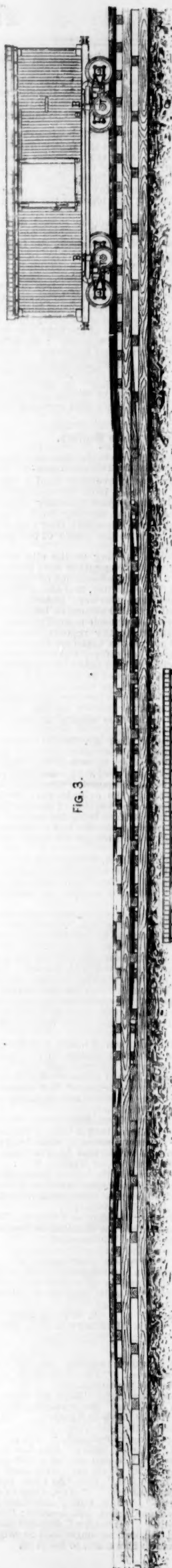


FIG. 3.

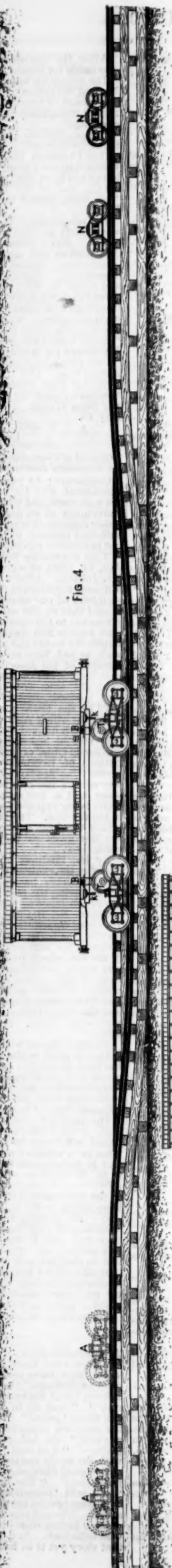


FIG. 4.

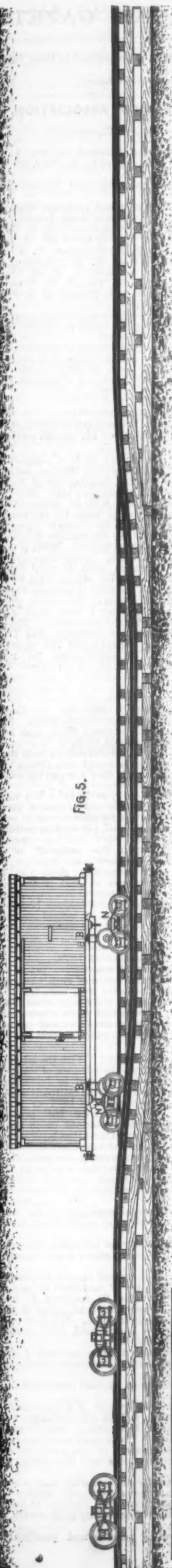


FIG. 5.

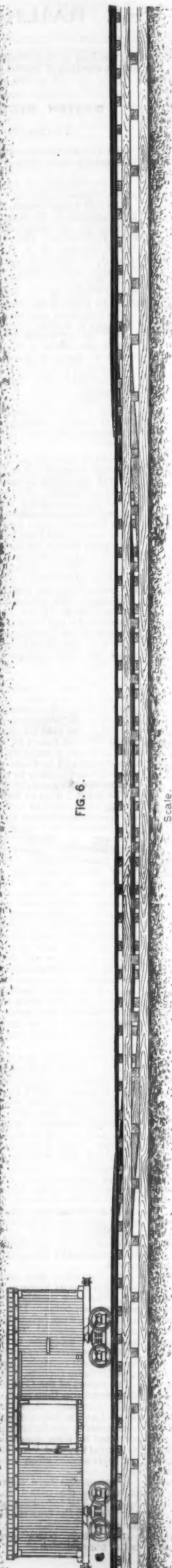


FIG. 6.

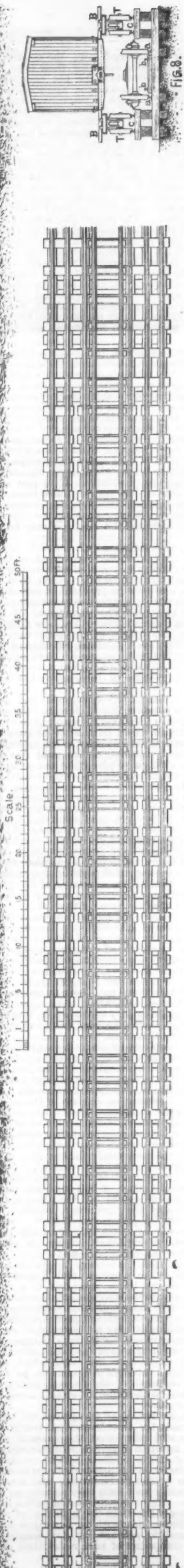


FIG. 7.

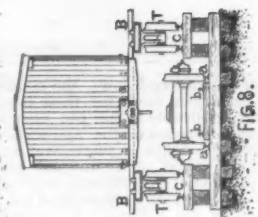


FIG. 8.

RAMSEY'S CAR TRANSFER TRACK.

Ramsey's Car-Transfer Track.

The chief evil which attends a diversity of gauges for railroads, and the one which overshadows all others, is the fact that it is impossible to run the vehicle, constructed with the wheels the proper distance apart for one set of rails, on another track of a different gauge, unless the wheels and axles are so arranged that the former can be moved on the latter. This latter form of construction, however, is complicated, liable to get out of order and has never met with much favor, and has only been used to a very limited extent. With our double "bogie" or truck system of cars, though, the bodies and the running gear are only connected together by the centre-pins or king-bolts. It is therefore comparatively easy to shift the bodies from one set of trucks to another, and consequently this method of transferring cars to and from lines of one gauge to those of another is now extensively employed.

One method of doing this is by what is called the car-hoist system; that is, the car-body is lifted up by screw or hydraulic jacks or lifts, the trucks of one gauge are removed, and those of another substituted. The body is then lowered and goes forward to its destination over a road of a different

the other truck, and the car is then run into the position shown in fig. 6. The narrow-gauge rails are here elevated somewhat above those of the wide-gauge, and consequently the narrow-gauge trucks are thus caused to bear the weight of the car-body, which takes the weight off from the cross-beams *B B*. The latter can therefore be withdrawn, and the car then rests entirely on the narrow-gauge trucks. The process can, of course, be reversed or varied to suit circumstances. If a number of cars of one gauge require transferring, the trucks for that number, or part thereof, are placed in the pit (this can be done before the train arrives) after which the car-bodies pass over the apparatus, each car leaving its trucks at the first incline and taking from the opposite incline the trucks of a different gauge. A pit one hundred feet long in the bottom will hold the standard trucks. Trucks are removed from the depression by a turn-table or switch, to sidings adapted to the location.

For making ordinary repairs to cars, a pit of this kind holding two trucks will answer. The apparatus can be used as an ordinary siding, when not otherwise employed. A locomotive and train can pass through the depression or pit without difficulty.

This system is now employed at a great many places where

4 ft. 8½ in. gauge, and Erie Railroad, 6 ft. gauge, at Waverly, N. Y.

Ligonier Valley Railroad, 3 ft. gauge and Pennsylvania Railroad, 4 ft. 9 in. gauge, at Latrobe, Pa.

Wilmington & Weldon Railroad, 4 ft. 8½ in. gauge and Wilmington, Columbia & Augusta Railroad, 5 ft. gauge, at Wilmington, N. C.

Washington City, Virginia Midland & Great Southern Railroad, 4 ft. 8½ in. gauge and Richmond & Danville Railroad, 5 ft. gauge, at Danville, Va.

Pittsylvania Railroad, 3 ft. gauge and Washington City, Virginia Midland & Great Southern Railroad, 4 ft. 8½ in. gauge, at Ward's Springs, Va.

Atlantic & Great Western Railroad, 6 ft. gauge and Rochester & State Line Railroad, 4 ft. 8½ in. gauge, at Salamanca, New York.

Dayton, Covington & Toledo, 3 ft. and Pittsburgh, Cincinnati & St. Louis Railroad, at Stillwater Junction.

Dayton & Southeastern, 3 ft. and Cleveland, Columbus, Cincinnati & Indianapolis Railroad, at Dayton, Ohio.

Northern Railroad of Canada, 5 ft. 6 in., and Hamilton & Northwestern, at Allandale, Ontario.

The Cincinnati Southern Trustees have contracted for two

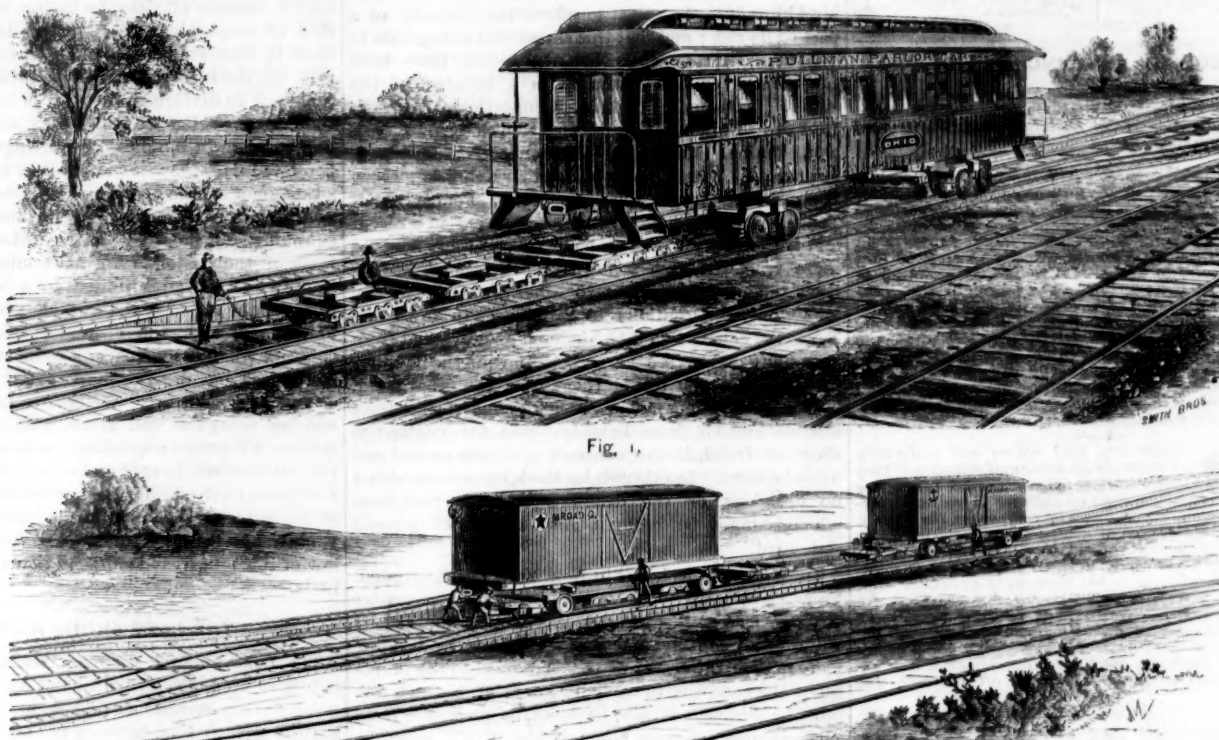


Fig. 1.

Fig. 2.

RAMSEY'S CAR TRANSFER TRACK.

gauge from that of the line from which it has been received.

The apparatus illustrated herewith is intended for the same purpose, but instead of raising the car-bodies up, the trucks are lowered, by running down an incline leading into a pit between the rails, while the body is supported on trucks on each side of the main track.

Fig. 1 is a perspective view of such an apparatus, with a Pullman car in process of transfer. It will be seen that its body is supported on the two trucks on the sides, while its own trucks have been run into the pit. Fig. 2 is a view of a similar apparatus with freight cars over it.

Their bodies, being narrower than those of the Pullman car, rest on transverse cross-beams underneath, which are supported by the side trucks.

The operation of this apparatus may be understood best from figs. 3-8, which represent elevations, sectional views and a plan. The construction of the pit may be understood best from fig. 8, which is a transverse section. It will be seen that two lines of rails, *a a* and *b b*, of the two different gauges are laid in the pit, which is about 20 in. deep. On each side, other lines of rails, *c c*, are laid, of a convenient narrow gauge—in this case 15 in.—on which the side trucks *T T* run, and which support cross-beams *B B* on which the car-body rests.

Fig. 3 is a side elevation, with a car on the right, which is to be transferred from its wide-gauge tracks to narrow ones. To do this the side trucks *T T* are first run alongside, and the cross-beams *B B* are placed underneath the body and on top of the side trucks. The car is then run over the pit into the position represented in fig. 4, which is a longitudinal section of the pit. As soon as the trucks of the car reach the incline, they of course descend, which causes the weight of the body to rest on the cross-beams *B B*, and by the time the car-trucks reach the bottom of the pit, they are entirely disengaged from the king-bolts, *K K*. They can then be run up out of the pit to *A A* on the left. A pair of narrow-gauge trucks, *N N*, are then brought from the track on the right, and are run down into the pit into the position shown in fig. 5. It will be noted that as the truck *N* ascends the incline on the left, if the car is brought immediately over it, the king-bolt *K* will engage with the truck centre-plate. The same thing is done with

3 ft. gauge roads connect with standard-gauge lines, and it is there the common practice to transfer the bodies of standard-gauge freight cars to the trucks of the narrow gauge and vice versa. Mr. Randolph, Superintendent of the Washington City, Virginia Midland & Great Southern Railroad, writes: "We are daily transferring freight cars between the 4 ft. 8½ in. and 3 ft. gauges, and even where the cars were badly overloaded with ore, the transfers have been made without difficulty; and although we have on the narrow gauge very sharp curvatures and heavy grades, the standard car-bodies upon our narrow trucks have given no trouble whatever."

In reply to the question "whether the broad gauge car-bodies run steady on narrow-gauge trucks," Mr. T. Mellon, Superintendent of the Ligonier Valley Railroad, wrote:

"This is the point that bothered us before we tried the experiment, but I am able now, after several months' experience, to say that there is no difficulty in this respect whatever. We ship and transfer cars of cattle, bark, lumber, ties, etc., without any special care of adjustment of the load to the centre of the car, and have not, in any instance, discovered the slightest tendency to sway or upset. The other day a Fort Wayne car arrived on the Pennsylvania Railroad, loaded with a portable saw-mill, boiler, engine, etc., to go up our road—quite a heavy, and top-heavy load—yet our men transferred the car-body as it stood, without hesitation, and took it to Ligonier without difficulty."

In some cases the car-bodies of 6 ft. gauge roads have been run on 3 ft. gauge trucks without any trouble.

The patentees of this apparatus say, however, that "narrow-gauge trucks, intended to carry standard-gauge car-bodies, should be constructed with heavy journals." It is also necessary that the centre-plates should be constructed so that they will interchange.

On a trial of speed, cars have been transferred, including the time required for uncoupling and coupling the brake-rods, at the rate of 1¼ minutes per car.

The following is a list of the roads and the localities where this apparatus is now used:

Pennsylvania & New York Canal & Railroad Company,

transfers, one to be located in Cincinnati and the other at Walton, Ky.

The Indianapolis, Delphi & Chicago Railroad Company has contracted for three transfers, to be located at Bradford, Monticello and Delphi, Ind. The Louisville, New Albany & Chicago has contracted for three for its repair yards at New Albany, LaFayette and Michigan City. The Washington City, Virginia Midland & Great Southern has contracted for another for repairing purposes at Alexandria, Va. The Pennsylvania & New York Canal & Railroad Company will put another in its new shops, now under construction, at Sayre, Pa. The Memphis & Little Rock Railroad has contracted for one at Little Rock, Ark. The Dayton & Southeastern has just constructed another at Musselman's to transfer with the Baltimore & Ohio Railroad, and the Dayton, Covington & Toledo has contracted for two more to be located at Versailles and Covington, Ohio.

Messrs. Ramsey & Scarlett, No. 110 South Fourth street, Philadelphia, are the owners of the patents of this apparatus, and will give any desired information relating to it.

Sparks.

A California paper in speaking of the advantages of a proposed single-track road says that "narrow-gauge engines cost from \$5,000 to \$10,000, and wide-gauge from \$8,000 to \$20,000." Prices are pretty high in California, but it is a long time now since Eastern builders even dreamed of getting \$20,000, or \$10,000 either, for a locomotive.

An Eastern church is credited with taking its building fund into Wall street recently and increasing it from \$40,000 to \$125,000. The new church will have all the latest improvements and a big steeple, and will be known as the church of "St. Paul Preferred."

But another Eastern church tried the same plan and got caught on a bear market. They have concluded not to build just now, but to get along with the old church for the present.

The other New York Elevated roads are lively enough, but a "lodge in a garden of cucumbers" is a stirring and a lively place compared with a station on the Second Avenue line in the middle of the day. The very gatemen and ticket sellers have acquired a grave and melancholy air, and seem to look with unfriendly eye upon the casual passenger, as upon one who causelessly disturbs their meditative solitude.

Maine railroads have heretofore taken the prize for hard names, but such stations as Wagweig, Soogomohoc and Toby Guzzle, in New Brunswick, rather lay over anything that Main can show.



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EDITORIAL ANNOUNCEMENTS.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

LIMITING THE LIABILITY.

The power of railroad companies to limit their strict common-law liability as common carriers is a subject which might most advantageously be regulated by a uniform national rule. No good reason exists why the law should vary in the various states through which the great connecting lines run and continuous contracts for transportation are executed, except the historic one that the several states are independent and their courts have seen fit to decide differently. Happily the conflict of opinion is gradually harmonizing. There is a tendency, after many years of discord, toward agreement. Some general propositions can be stated which obtain as law in most of the states, and are probably winning universal assent.

That there may be a limitation of the liability is now almost everywhere conceded. The questions of our time relate to the manner and degree. They are chiefly these: Is notice sufficient, or must the customer assent? If assent is requisite, must this be explicit, or may it be implied from silence or imputed from circumstances? May the entire double liability of the company be restricted, or is the privilege of limiting it confined to that aspect of the carrier's responsibility in which he is viewed as an insurer, leaving the liability for negligence, either of the principal or of his agents and servants, to be invariably enforced according to strict rules of law.

The doctrine of the Supreme Court at Washington upon these questions may well attract prominent attention for the obvious reason that it is a guide toward a national rule. Should the state courts, either from conviction or from motives of comity, see fit to assent to the rulings of the chief federal tribunal, a uniform law would be the result. The course of decision in that court is understood to disallow a mere notice. The liability of a company may be limited by a contract; but an explicit assent by the customer is necessary: neither published advertisements, nor notices posted in the offices, nor clauses incorporated in or indorsed on the receipt given will protect the company, when the controversy comes before a federal court, from the full common-law liability. Acceptance of a

railroad receipt without objection is not enough, standing alone, to bind the customer by exemptions which may be claimed within it. There must be a proper contract, by mutual assent. And the privilege of contracting for a limitation is allowed only within such limits as to the judges seem just and reasonable and consistent with the general policy of the law; thus, in particular, even an explicit contract that the company shall not be chargeable for losses from negligence is not enforceable against the customer.

The decisions in a number of the states appear to be substantially in accord with the United States Supreme Court's views; not indeed in deference to any supposed authority, for the subject is one upon which the courts act independently, and many of the state decisions are earlier in date than those of the Supreme Court. But the positions that a notice to the customer does not affect his rights even if brought to his knowledge, but he is entitled to commit his property to the company for transportation under its public duty as a carrier, if he chooses to do so; that he may, however, if some advantage, such as a lower rate, is given him, bind himself by an assent to relieve the company of a part of its risk; and that this assent will not operate to discharge it from losses by negligence, have been taken more or less distinctly in a number of the states. Alabama, Colorado, Connecticut, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, North Carolina, Ohio, Pennsylvania, Tennessee, Vermont, Virginia, are stated in a recent and trustworthy work* to have substantially adopted these tenets; though some of the decisions, having been rendered in respect to other kinds of carriers, apply only inferentially to railroads. In Iowa and Texas the courts would be hindered or prevented from sustaining even express contracts limiting the liability, by statutes which forbid them. On the other hand, in West Virginia a common carrier may by contract absolve himself from liability, even for negligence short of fraud, if the contract is clearly proved and unambiguous. In other states there have been either no decisions, or the decisions embrace variations which cannot be brought into any brief general statement.

The course of decisions in New York has fluctuated. Early views were adverse to allowing the companies any privilege of throwing off the liability imposed by old English law. Later cases continue to disallow mere notice; the assent of the customer to the proposal of the company to carry his goods at his own risk must be obtained; it may, however, be presumed from such circumstances as fairly imply it, for example, from accepting a receipt containing a limitation with full opportunity to understand its terms, and without objecting. By special contract the companies may protect themselves from any liability, including that for losses ascribable to negligence of employés. The company cannot absolve itself at all by any act of its own agents merely; but, with the assent of the customer freely given and fully proved, the limitation may be carried to any extent. The rule is, however, administered with a good degree of strictness. The courts have declared that special clauses in railroad contracts ought always to be construed, if possible, as designed to embrace only losses which are not attributable to negligence. Every presumption (they say) is against an intention to contract for immunity for not exercising ordinary diligence in the transaction of business. If, therefore, the language of the contract admits of two constructions, that one is firmly preferred which leaves the company liable for losses accruing by negligence, and exempts it from those only which arise otherwise. This view is carried very far. In a noteworthy instance, a railroad receipt for live stock contained a stipulation to release the company from all liability "of every kind and character whatsoever for, and, on account of or connected with any damage or injury to, or the loss of said stock or any portion thereof, from whatsoever cause arising." To the general reader this will seem apt language to include losses from negligence. But the Court of Appeals understood it differently; said that it might well be satisfied by limiting it to such extraordinary liabilities as carriers sustain with fault or negligence on their part, and held that it did not relieve from negligent losses.

There does not appear to be just reason, in principle, for an absolute rule that companies may not, by special contracts, be absolved from the risk of negligence. It may well be said that the probabilities are against such an agreement; that public policy would frown upon it in a majority of cases; that it ought not to be sustained unless clearly proved and justified by peculiar

circumstances and adequate consideration; and especially that it should be scrutinized for indications of any coercion or advantage taken of the customer's ignorance, inexperience or haste. But cases may easily be stated and will sooner or later arise in the courts in which a customer deliberately and for good reason assumes the risk of negligence, and should be held to his bargain. There is nothing in public policy to forbid that a competent business man, acquainted with the facts, and induced by profit or economy, should assume the risk of negligence of persons whom he does not appoint or control. This is involved in every fire and marine insurance; the company assumes the risk of negligence of persons employed by the property-owner. Sureties may often be involved by the negligence of those employed by the principal. Partners are guarantors to those dealing with the firm against each other's negligence. Let it be supposed that a firm of bankers or brokers, under daily necessity of transporting government bonds between various cities, desire to avail themselves of the transportation facilities of the railroad and express companies, but are willing, for economy's sake, to assume all risks, including fidelity, care and skill of employés. They might do this by buying stock in those companies; then, though charged full price for the transportation, they would receive a portion back in dividends, by way of compensation for the risk of negligence which they assume; and public policy would be in no respect infringed. No reason is perceived why the same thing may not be done by an adjustment of the charges of the carrying company. If the proper charge for expense and risk together is equitably split in two, if a fair deduction is made in favor of the customer for his assuming the risk, and the carrier's charge is limited to a lawful compensation, for the expense, if the facts are fully and fairly understood, and the customer makes the special contract voluntarily, his engagement to bear risk of negligence may deserve support in the courts as much as any other contract. We believe that the courts will one day recognize and allow, under special circumstances, a contract acquitting a railroad company from risk attributable to negligence; and when this is done, a comparatively slight yielding by the courts in a few of the states of their own view in deference to the advantage of a common rule, will establish the American law of this long-vexed subject upon a very satisfactory basis.

THE LAKE SHORE REPORT.

The Lake Shore & Michigan Southern Railway occupies an unique position among American railroads, more so than appears at first sight. As the western half of a trunk line, between the seaboard and Chicago, it may very well be compared with the line formed by the Great Western and the Michigan Central, with the Pittsburgh, Fort Wayne & Chicago, or with that part of the Baltimore & Ohio west of the Ohio. It has no great advantages over two of these lines as a route between Chicago and the East, as may be known by the fact that in the apportionment of Chicago shipments it is awarded considerably less than the Michigan Central and not much more than the Fort Wayne road. One of its advantages consists in the position of the eastern half of it (Buffalo to Toledo) just alongside and south of a great navigable lake. It is true that this lake effectually cuts off traffic from the north, and this might be considered a great misfortune were it not that while it cuts off traffic from that direction, it attracts traffic for hundreds of miles from the other direction. Several years ago, when most of the great railroads of the West this side of the Mississippi were planned, this attractive power of a navigable lake was much stronger than it is now. The general direction of traffic then, as now, was on east-and-west lines, but the cheapness of water transportation was sufficient to induce not only shipments but the construction of long railroad lines which deviated far from the direct route to the East. Then, too, the great markets were established on the lakes, and became the centres of separate railroad systems, all carrying to the lake ports and contributing a large part of their traffic, and of late years the greater part of it, to the east-and-west road through those ports. Thus we see among the older lines running from the southward and south-westward to Lake Erie such lines as the Erie & Pittsburgh, the Sandusky, Mansfield & Newark (now a division of the Baltimore & Ohio), the Cincinnati, Sandusky & Cleveland, the Cleveland, Columbus, Cincinnati & Indianapolis, the Dayton & Michigan, and the great Wabash road. Now if there were no Lake Erie, while the Lake Shore road would be able to get local traffic from the north as well as from the south between Buffalo and Toledo, it would not have anything like that great system of contributory roads which penetrate the country as far

* Lawson on the Contracts of Carriers, Ch. 2.

south as the Ohio and as far west as the Mississippi, and even the Missouri. These roads bring traffic to the Lake Shore rather than to roads which cross it further south, because it is the road at their terminus, and when they deliver to it they get the longest possible haul over their own lines. Thus, without any control over these connections, the Lake Shore has received most of the through traffic which these roads carry to the north. Within a few years the number of these roads has been considerably increased, and within a year past one of some 400 miles (the Lake Erie & Western) has been added, whose through connections are with the Lake Shore exclusively. Many years ago most, probably, of the freight which these roads brought to Lake Erie was forwarded to Buffalo by lake, but recently, since rail rates have become so low, it is not often that it pays to make two transfers for the difference between the rail and the lake rate for 250 miles or less. Then the passenger business which all these lines bring is something enormous. West of the trunk lines, there is no railroad in this country which commands so large a through traffic, while the row of important towns on its line—Buffalo, Erie, Cleveland, Toledo and Chicago—cannot be matched on any other line of equal length so far west.

The summary of the annual report for 1879, which we published last week, shows with perfect clearness the progress of this road in traffic, earnings and profits. In the traffic, the freight business was unexampled, 29 per cent. greater than in 1878 and three times as great as in 1870, the first year of the consolidated company, though there has been little increase of mileage since. In passenger traffic, however, though the business of 1879 was 5.6 per cent. greater than in 1878, it was less than in any of the seven years previous to 1877. The progress in rates is still more notable. In passenger rates it has not been considerable; but the average freight rate in 1879 was nearly one-third less than the average expense in 1870, and less than that expense no longer ago than 1875.

This is one of the roads which show the smallest average cost per unit of traffic. For the year 1879, or the fiscal year nearest to it, the average receipt and expense per ton and per passenger per mile of the following roads have been reported as follows, in cents:

	—Per passenger mile.—			—Per ton-mile.—		
	Re- ceipt.	Cost.	Profit.	Re- ceipt.	Cost.	Profit.
Boston & Albany*	2.140	1.241	0.899	1.073	0.622	0.451
New York Central*	2.050	1.190	0.860	0.796	0.541	0.255
Erie*	2.091	1.594	0.497	0.780	0.561	0.219
Pennsylvania:						
Penna. R. & D. Div.	2.281	1.082	0.509	0.706	0.427	0.309
United N. J.	2.173	1.041	0.532	1.473	1.012	0.461
Phila. & Erie	2.944	2.923	0.021	0.512	0.354	0.158
All Penna.	2.255	1.709	0.546	0.824	0.480	0.344
Pitts., Cin. & St. L.	2.410	1.480	0.930	0.720	0.420	0.300
Col., Chic. & Ind. Cen.	2.510	2.270	0.240	0.700	0.590	0.110
Vandalia Line	2.506	2.559	0.067	0.831	0.715	0.216
Mich. Cen.	2.210	1.414	0.796	0.692	0.407	0.285
Lake Shore & Mich. So.	2.223	1.448	0.775	0.642	0.308	0.244
Cleve., Col., Cin. & Ind.	2.579	1.135	1.444	0.697	0.575	0.122
Chicago & Alton	2.419	1.282	1.137	1.054	0.558	0.496
Illinois Central	3.050	1.273	1.777	1.520	0.640	0.880
Chic., Mil. & St. P.	2.930	1.603	1.327	1.720	0.941	0.779

* These three roads for the year ending with September, 1879; the others for the calendar year.

We see here that a few roads report a lower average cost per passenger mile than the Lake Shore, but only one a lower average freight cost. This one is the Philadelphia & Erie, which reports an average expense per passenger per mile twice as great as the Lake Shore's. The Philadelphia & Erie, too, is the only road that reports a lower average receipt per ton per mile. So great is this difference in the cost of conducting the freight, even when compared with roads famed for low cost of working, that if the New York Central's freight traffic had cost no more than the Lake Shore's per ton per mile, its net earnings would have been greater by more than three millions of dollars, and if the cost on the Lake Shore had been as great as on the New York Central, the Lake Shore's profits would have been less by about two and a half millions, and instead of 5½ per cent., its dividends would have been but 1½ per cent. Of course, circumstances determine these expenses to a very great extent; what we wish to show particularly is the very great effect on profits caused by what appears a minute saving in the cost per unit of traffic.

The average freight-train load, which last year we mentioned as the largest we had seen reported has again increased, and is for 1879 231 tons, which is double the average on most roads, probably, and 80 per cent. more than the average on this road no further back than 1873, since which time it has increased just 100 tons—from 131 to 231. It is largely due to this large train-load, of course, that the average expense per ton has been reduced to so very small an amount. There are not many roads whose grade and alignment permit such heavy loads; but a good deal is due to heavy engines and careful work, while last year's gain must be largely credited to the increase in west-bound freight, which is accommodated without any increase of train mileage.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Shenandoah Valley.—Extended from Riverton, Va., south by west to Bentonville, 11 miles.

Louisiana Western.—Track laid from Vermillionville, La., west 6 miles; also from the other end of the road east to the Mermontau River, 4½ miles.

Texas & Pacific.—Track laid from Ft. Worth, Tex., west 21 miles.

Utah Southern Extension.—Extended from Black Rock Springs, Utah, south by west to Milford, 24 miles.

Denver & Rio Grande.—The Leadville Branch is extended northwest to South Arkansas, 38 miles. Gauge, 3 feet.

This is a total of 104½ miles of new railroad, making 1,364 miles thus far this year, against 493 miles reported at the same time in 1879, 312 miles in 1878, and 354 miles in 1877.

BARON M. M. VON WEBER, translations of some of whose writings have been published in these columns, giving, however, but a very inadequate insight of his wonderful knowledge of railroads and their working and relations, and his extremely suggestive and often very eloquent discussions of questions concerning them, has been appointed by the government of the German Empire to visit this country for the purpose of studying and reporting upon our internal water communications, especially river improvements, and what in Germany are called "secondary railroads," that is, cheap local lines for light traffic, including narrow-gauge roads. Though his official report may be restricted to roads of this kind, we may be sure that he will at some time and in some way give his impressions of our railroad construction and practice in general, and as he has studied on the ground the railroads of nearly every country in Europe, his criticisms are likely to be decidedly interesting. Weber, as probably most of our readers know, is a son of the great musician, Carl Maria von Weber. He served his apprenticeship as an engineer some 35 years ago under Isambard Kingdom Brunel, and in the Borsig Locomotive Works at Berlin—the largest on the Continent. For many years he was Manager of the Saxon State Railroads, afterward Consulting Engineer of the Austrian Government for railroad matters, and for a few years past has been attached to the Prussian Minister of Public Works, where his service began by reporting upon a proposed great system of local or "secondary" railroads, which the government purposes to carry out gradually, together with an extended system of improved water-ways. The extent and variety of his railroad studies may be estimated from the following titles of some of his works: "Experiments on the Stability of Permanent Way"; "The School of the Railroad"; "The Construction and Operation of Secondary Railroads with Narrow and Standard Gauge"; "The Individuality and Progressive Development of the Railroad"; "Nationality and Railroad Policy"; "Standard and Narrow Gauge"; "The Valuation and Purchase of Railroads"; "Safety in Railroad Operation"; "Private, State and Imperial Railroads"; "Operating Railroads through long Tunnels"; "The Position of German Engineers in Society and the State." Most of these are small works of from 30 to 100 octavo pages. He is also the author of an extended biography of his great father, and is a frequent contributor to the leading German review. We recommend him particularly to the attention of the railroad men and others who may be able to give him information. He will probably arrive early in June.

LAKE AND CANAL RATES have both advanced a little during the past week. Lake rates, which had been as low as 3 cents per bushel for corn from Chicago to Buffalo, but a week ago, Wednesday had advanced to 3½ cents, went up to 3½ cents Thursday, and most of the time since have been 3½ cents, while quotations for wheat have been 4 and 4½ cents. Last Wednesday's quotations are 4 cents for corn and 4½ for wheat. Canal rates have advanced just ½ cent, to 5½ cents for corn and 6 for wheat from Buffalo to New York. Heretofore for several years the course of these rates has been steadily downward until June, and at the lowest point through that month. At this time last year the lake rates were 3 cents for corn, and the canal rate 4 to 4½ cents, and last year this was just after the opening, and the canal rate was the highest until July. The diversion of vessels to the Lake Superior ore trade after one cargo of grain down seems to have had the expected effect; and now the receipts of grain at lake ports are so large that the demand is increased; but the current lake and canal rates are made possible only by the maintenance of rail rates much higher than last year's. At present prices it costs about 11 cents to send a bushel of corn from Chicago to New York, and the all-rail rate is 16.8 cents—about one-half more. But the railroads are getting a fair amount of grain, notwithstanding the difference, and their gross receipts, not to say profits, for carrying grain are probably greater than last year. This, doubtless, is not true of some roads, and those affected most by lake competition may not be earning much from grain at this time; but then last year, though they may have been busy, they were paying for the privilege by carrying for less than cost.

NEW YORK CENTRAL EARNINGS for the month of April show the very large increase of \$567,698, or 23½ per cent., which is very much greater than the increase in March or February, though rail shipments eastward were larger a year ago than this year in April, lake navigation being open nearly all the month and canal navigation ten days of it this year, but not at all last year. But last year through rates were based on a New York-Chicago rate of 12½ to 15 cents per 100 lbs.; this year on a 35-cent rate for nearly half

the month and a 30-cent rate the rest of it. The deepest demoralization in these rates was in May and June, however, so that the comparisons will probably be very favorable for these months, too. However, not all the improvement can be ascribed to the maintenance of east-bound rates. There is a much heavier through west-bound business at the same rates as last year, and also a more active local business.

For the seven months of the fiscal year ending with April the increase in the earnings of this road has been 15.7 per cent., amounting to \$2,584,000, which is equivalent to nearly 3 per cent. on the stock. It must not be supposed that all this increase is net, however; it would cost more to carry the larger traffic at the same prices, and prices of labor and materials are a great deal higher than a year ago. But the improvement is a very great one, and if it continues through the other five months of the fiscal year at the same rate the gross earnings of the year will be nearly \$33,000,000, while the largest heretofore (in 1872-73) were about \$32,500,000.

NEW YORK, LAKE ERIE & WESTERN EARNINGS are now reported for March and for the six months of the fiscal year ending with March. For March the increase in gross earnings is 21½ per cent. and for the half-year 13½ per cent. This company also reports its working expenses—very valuable information in these times of changed prices. For March they were actually less this year than last (nearly 5 per cent.); for the half-year they were only 5½ per cent. more. The traffic, it should be remembered, was very heavy both years, but the road has been better fitted to conduct it economically this year. The increase in net earnings is very great—32½ per cent. in the half-year and no less than eighty per cent. in March. Should the ratio of increase in gross earnings and expenses for the half-year continue through the year, the net earnings will be about \$6,870,000, which is \$1,665,000 more than last year, about \$1,000,000 more than the interest and rentals that will accrue this year, and \$800,000 more than when full interest will accrue on the bonds. It requires about \$600,000 to pay 7 per cent. on the preferred stock.

THE GRAIN MOVEMENT, which fell off shortly after the opening of navigation, especially in the amount of receipts at Northwestern markets, has lately greatly increased, the explanation being probably that the farmers are not so much occupied with their spring work, though this is usually a very busy season with them; but there have been nearly 600,000 bushels received in Chicago in a single day this week. Receipts at New York are also greatly increased by arrivals in canal boats. The first of them, we believe, was May 1, and one day since the boats delivered more than a million bushels. The canal shipments in April (11 days) amounted to 2,740,000 bushels of grain of all kinds. It is noticeable that while wheat has been but a small portion of the total movement for some months, and is still, it formed nearly two-thirds of these canal shipments.

ENGLISH COAL RATES have been the subject of complaint by producers in some of the districts lately, and the discussion affords some indication of what the rates are for some important parts of the traffic. The party or district which was mentioned as being unduly favored, has its coal carried 259 miles for 9s. 3d. per ton—equal to \$2.25, or just about ½ cent per ton per mile. From South Yorkshire to London, 161 miles, the charge is 8s. 3d., or \$2 per ton—1.24 cent. per ton per mile. A company carrying to Hull charges 1½ cents per ton per mile. These rates are something like what could be found in this country; but our rates, at different times and in different places, sometimes go much lower than the lowest and sometimes higher than the highest mentioned above.

The Prevention of Smoke from Locomotives.

(Report of Committee to the Thirteenth Annual Convention of the Master Mechanics' Association, Cleveland.)

CHICAGO, May 1, 1880.

To the American Railway Master Mechanics' Association: GENTLEMEN: Your committee, appointed to report on the best means of preventing smoke from locomotives with due economy in fuel, would beg to submit the following:

A circular was issued for the purpose of eliciting information from the different master mechanics in the United States and Canada. Few answers were received, and these, with four or five exceptions, were brief, presenting simply the conclusions arrived at, but not the facts and statistics on which they were based.

The circular of your committee was as follows:

"CHICAGO, Jan. 1, 1880. 'The officers of the American Railway Master Mechanics' Association, at their annual meeting, held at Cincinnati, May, 1879, appointed the undersigned a committee on the subject of the best means of preventing smoke from locomotives with due economy in fuel.

"In order that the Committee may make as full and comprehensive report as possible upon this subject, they desire to get the experience and results of experiments made by the different master mechanics of the country who are using bituminous coal for fuel.

"First. Do you use a fire-box in your locomotive different from that ordinarily used, for the purpose of preventing smoke? If so, please describe it.

"Second. Have you used the fire-brick arch, or any peculiar mode of admitting air to the fire? If so, please describe it and state with what success.

"Third. To what extent can air be admitted to the fire-box, above the grates, before it becomes detrimental to the steaming qualities of the engine?

"Fourth. Do you think it possible, with bituminous coal, to prevent the emission of smoke from a locomotive running with a full train over an undulating road? If it can be prevented, describe the appliances producing such result.

"Please give any other information you may possess bearing upon this subject.

"An early reply will greatly oblige, E. T. Jeffery, H. A. Towne, Sanford Keeler, Committee.

"Please address your reply to E. T. Jeffery, Superintendent Illinois Central Railroad, Chicago, Ill."

In past years reports have been laid before you, giving the

comparative results obtained with coal-burning engines having plain fire-boxes and the fire-boxes arranged with water-tables or fire-brick arches. We do not deem it necessary to recapitulate herein the facts submitted.

Before presenting our recommendations, we invite your attention to the following letters from Messrs. N. E. Chapman, James M. Boon, Jacob Johann and W. H. Purdy, believing that the observation and experience of these gentlemen have enabled them to embody in their communications views and suggestions which should command the attention of the railway master mechanics of the country.

FROM N. E. CHAPMAN.

"Pennsylvania Company,
"Operating the Cleveland & Pittsburgh Railroad.
"Office Master of Machinery.
"CLEVELAND, O., March 5, 1880.

"E. T. Jeffery, Supt. Ill. Cen. R. R., Chicago, Ill.

"DEAR SIR.—In answer to your circular of Jan. 1: We use the plain fire-box, without brick arch. We are now using upon our locomotives, in the passenger service, what is known as the 'Smith stack,' the same as has been in use upon the Pennsylvania Railroad for some years. In addition to it, we are using an arrangement for admitting air to the fire-box above the fire by inserting four two-inch tubes, both in front and back of fire-box, with a small jet of steam admitted just at the outer end of the tube. It is an old English device, known as the 'Clark's patent.' The patent has, however, expired, I am told. The introduction of steam to the tube is to create a current of air. I have not yet determined just what amount of air is necessary to give the best combustion.

"I am trying some experiments by closing or reducing the size of the tubes, to ascertain about the requisite amount of air. Prof. P. H. Dudley claims that the results of his experiments show that too much air has generally been admitted above the grate or from below.

"We are getting excellent results from the use of the straight or Smith's stack in connection with Clark's smoke-consumer. Our General Manager, in a ride over our line recently, behind an engine so equipped, expressed himself after this fashion at the end of the trip: 'Chapman, it was the cleanest ride I ever had, either behind a wood or coal-burning engine.'

"I find that judicious firing is absolutely necessary to cleanliness.

"In answer to your fourth question, I do not believe it possible to use bituminous coal as a fuel for hauling heavy freight trains, at a moderate speed, without the emission of smoke, and considerable of it. The time is so short or the combustion so rapid, that it is, I believe, impossible, practically, to consume in the locomotive fire-box the gases which form the smoke. The time must be extended and the combustion slower to do it. Great relief from the nuisance can be had by the fireman using good judgment in putting in coal. There is also great difference in the coals found in various sections of the country, hardly any two of which require the same treatment.

"Trusting the foregoing may be of some service to you, I remain, Yours truly,
"N. E. CHAPMAN,
"Master of Machinery."

FROM JAMES M. BOON.

"E. T. Jeffery, Esq., Chairman Committee on 'The Best Means of Preventing Smoke From Locomotives with due Economy in Fuel.'

"I would say in answer to your circular:

"First. We use the ordinary fire-box.

"Second. Have used the fire-brick arch with hollow stay-bolts. The first row of these bolts was seven inches above top of grates, the next row four inches above the holes. The holes were three-eighths inch in diameter. There were sixty-two holes in all.

"With this arrangement, we found that we could get about seven miles more to a ton of coal than could be made with the same engine without the arch and with the hollow stays plugged up. The combustion was almost perfect if properly fired; there would be no smoke from the stack. About the time we were using the brick arch we were having considerable trouble with fire-box sheets cracking, and we thought the arch might be in part the cause of the trouble, and abandoned it. Was at that time, and am now, very favorably impressed with the brick arch and believe, with the fire-box steel now being manufactured, the arch can be used to advantage. Have also used the Clark steam jet. This is an English invention and was used there about 1857. It consists of holes in the fire-box about the line of the top of the fire, about twelve or fifteen inches from centre to centre, depends on length of fire-box; also holes in back end of fire-box. These holes to be from 1½ to 2 inches diameter; each one to have projecting in from outside a small tube, say ¾ inches diameter inside the opening of this tube at end to be closed to about ⅓ of an inch, these tubes to be connected with steam pipes from boiler regulated by a cock within reach of the engineer and fireman. The idea was to blow steam through these small tubes into the fire-box, carrying the air with it and forcing it into the gas supplying the necessary air to produce combustion of the gases. By opening or closing the steam-cock the admission of air could be regulated—increased when fresh coal was placed, or diminished as gases were burned. There is not much saving of coal by this arrangement, with an engine the boiler of which has to be forced to keep up steam. With a heavy train at slow speed, the gases will all be consumed; with a heavy train at high speed they will be partly burned; at high speed with a light train all will be consumed. With large boilers of ample capacity very good results are obtained.

"Third. The extent to which air can be admitted to a fire-box, before it becomes detrimental to the steaming qualities of a boiler, has not, as I am aware of, been definitely settled. Am of the opinion that with boilers fed with bituminous coal there should be provision made for a free admission of air, so arranged that the quantity of air admitted could be regulated or entirely shut off, if necessary.

"Fourth. I believe that the emission of smoke from bituminous coal, burned in the fire-box of a locomotive, can be prevented with any kind of a train or road. To prevent it, the first essential point is good firing. No matter what the appliances are, or how good they may be, bad firing will cause the emission of smoke from the stack. With an expert fireman good results can be obtained with a plain fire-box. Next to good firing, large boilers and fire-boxes are necessary. They should be so large that the full power of the engine would be developed without forcing the fire. As a general thing, our locomotive boilers are too small. The fire has to be forced from the start to keep up steam.

"I believe we will never get the proper results from burning coal in locomotive furnaces until the men on engines are educated to fire properly, and with some idea of combustion. There is an insane idea with them that a coal-burner engine is not burning the fire right unless the black smoke is rolling from the stack, and instead of trying to prevent smoke they are actually trying to make it.

"It will be found, I think, without exaggeration, that ninety-five engineers and firemen out of one hundred will so express themselves, and they evidently believe it.
(Signed) "JAS. M. BOON."

FROM JACOB JOHANN.

"E. T. Jeffery, H. H. Towne, Sanford Keeler, Committee on the Best Means of Preventing Smoke from Locomotives with due Economy in Fuel.

"DEAR SIR: In reply to your circular on this subject, I will submit the following answers to your questions in their order:

"First. I have nothing special or new, and am only using the ordinary square fire-box.

"Second. I have used the fire-brick arch and also hollow stay-bolts to admit air above the fire, but have now entirely abandoned their use, for the following reasons:

"First. While the brick arch was hot it materially reduced the volume of black smoke and the expulsion of cinders, thereby effecting more perfect combustion; but this advantage was more than counterbalanced by the increased cost of additional repairs, necessitated by the use of the brick arch, both in keeping the arch and the fire-box in repair.

"Second. In the use of hollow stay-bolts I found no particular advantage, and for the particulars of my reasons for abandoning their use, I refer you to my report and tabulated statement, in the Twelfth Annual Report of the Master Mechanics' Association, on pages 80 and 82, respectively.

"Third. With the average bituminous coal used on this road, I should say that 230 cubic feet of air is required to effect thorough combustion of one pound of coal; and whether admitted entirely through the grates, or partly through the grates and partly through hollow stay-bolts above the grate, any total quantity admitted per pound of coal, in excess of this amount, will prove detrimental to the steaming qualities of the engine, which will be manifested in two ways:

"First. It reduces the temperature of the gases in contact with the heating surfaces, and if the excess is very great it is apt to cool the gases below the point of ignition, in which case they would pass out the chimney and be wasted.

"Second. It increases the volume of the gases beyond what is necessary, which increased volume, in order to escape, must pass through the flues with greater velocity, thereby diminishing not only the temperature of the gases, but also diminishing their time of contact with the heating surfaces, thus preventing them from imparting to the water the maximum quantity of heat.

"If the quantity of air admitted is too little to effect perfect combustion, valuable fuel is lost by the escape of unignited gases.

"In my practice, as previously stated, I have found by actual experiment, that with a large fire-box, with properly constructed grate-bars, and a fire not over six inches deep, a sufficient quantity of air can be admitted through the grate and fire-bed to cause complete combustion, and that the use of hollow stay-bolts under such circumstances proves exceedingly detrimental to the engine's steaming qualities.

"Fourth. I am not aware of the existence of any method or device that will entirely overcome the emission of smoke from the combustion of bituminous coals, that can be used with any degree of economy. A careful and observant engineer and fireman, by proper manipulation, can, however, mitigate this nuisance to a great extent.

"Very truly yours,

"JACOB JOHANN, Master Mechanic."

FROM W. H. PURDY.

"Chicago, St. Louis & New Orleans Railroad Co.,
"Office of the Superintendent Machinery,
"McCOMB CITY, Miss., March 6, 1880.

"E. T. Jeffery, Esq., Chairman, etc.,

"DEAR SIR.—My reply to your circular of January 1 has been delayed by the pressure of other duties. There is not much that I can say, but I respectfully submit the following answers to your questions:

"First. We use the plain fire-box in such of our locomotives as burn bituminous coal.

"Second. No, sir; I do not know that any device for preventing smoke has ever been used on this road.

"Third. I think air may be admitted above the grates with beneficial results, so far as the consumption of smoke is concerned, and without detriment to the steaming qualities of the engine; but I do not think this can be accomplished by any fixed or automatic arrangement placed beyond the control of the engineer. A fresh fire requires more air to be mixed with the gases liberated from the coal, and the quantity of air admitted should vary with the nature of the work being performed by the engine.

"To get the best results from the admission of air, the device should be under the control of the engineer or fireman, and would require very frequent attention; perhaps more attention than could at all times be given by the person in charge.

"Fourth. I do not think it is practicable, and I scarcely think it possible, to entirely prevent the emission of smoke, under all circumstances, from an engine burning bituminous coal. I have never seen a device that would effect this result.

"Air openings, brick-arches etc., will assist in effecting a more perfect combustion of bituminous coal, but I think the objections to them are sufficient to offset any advantages that might be derived from their use. So far as I have been able to observe, the best preventive of smoke is care and intelligence in firing. If these were generally exercised, I think we should consume at least one-half of the coal that now escapes from the stack in the form of smoke, our engines would show better results from the fuel used, and the people who ride in our trains or live along our lines would have but little cause to complain of the nuisance arising from the use of bituminous coal-burners.

"Respectfully yours, W. H. PURDY,
(Signed) "Superintendent of Machinery."

Mr. James Sedgely, of the Lake Shore & Michigan Southern Railway, states that the plain fire-box is used on his line; that with repeated tests he finds no benefit in using the fire-brick arch, and that the best results are obtained by using one row of hollow stay-bolts with one-quarter-inch hole all around the fire-box.

Mr. W. O. Hewitt reports experiments made with engines Nos. 41 and 42 on the Toledo, Peoria & Warsaw Railway. The engines are duplicates with furnaces 5 ft. 7 in. long, 2 ft. 11½ in. wide and 4 ft. 10 in. high.

No. 41 was run with a plain fire-box and no air-openings above the fire.

No. 42 had a fire-brick arch and 80 hollow stay-bolts, with ½ inch holes, placed in two rows and distributed as follows: 25 on each side, 20 in front and 10 in the back of furnace. The lower row was 6 in. above the top of grate.

The engines were employed in freight service, and each hauled an average of 17½ loaded freight-cars.

No. 41 averaged 39.8 miles per ton of coal.

No. 42 " 34.6 " " " "

The general dimensions of the engines are not given in Mr. Hewitt's communication.

Your committee are of the opinion that it is impracticable to lay down a fixed rule giving the proportions of locomotive boilers designed to burn bituminous coal.

The heating qualities of different coals vary greatly, and the grate area, number of square feet of heating surface, size of fire-box, and, in fact, the general dimensions of boiler,

should be varied to correspond with the evaporative capacities of the different coals.

Where the evaporative power of coal is small, large boilers and furnaces are an absolute necessity for the economical consumption of fuel and the lessening of the smoke nuisance; because coal which has limited heating capacity contains a large proportion of foreign substances, which occupy a portion of the grate surface and fire-box which would be available for the purposes of combustion with a fuel having greater heating capacity and consequently fewer impurities.

It may be said that the foregoing is more in the interest of economical consumption of coal than the prevention of smoke. To this we say that the two must inevitably go together. Where economical consumption of fuel is obtained, the emission of smoke is reduced to a minimum. Economical consumption of coal means the burning of all the combustible substances contained in the coal, either in solid or gaseous form. If this could be attained there would be no emission of smoke in the proper meaning of the word, but of a slightly colored gas, resulting from combustion.

The following table shows the heating qualities of some of the Western coals with which experiments have been made on the Illinois Central Railroad:

STATE.	NAME OF MINE.	Service of engine.	Miles run.	Pounds of coal used.	Pounds of water evaporated.	Pounds of water evaporated to 1 pound of coal.
Illinois.	Moss Bank.....	Freight	541	32,953	169,008	5.13
	Tamaroa.....	"	538	33,322	184,738	5.54
Ind.	Brazil (Block).....	"	1,334	74,845	410,913	5.48
Illinois.	Fairbury.....	"	533	34,085	173,847	5.10
	Enterprise.....	"	537	35,413	170,067	4.97
Iowa.	Fort Dodge.....	"	470	38,928	146,823	3.77
Illinois.	La Salle.....	"	531	38,825	173,041	4.45
	Wilmington.....	"	537	38,153	182,117	4.77
	Union No. 2.....	"	528	34,220	184,940	5.40
	Carbondale.....	Pass.	1,104	42,396	268,067	6.32
	"	Freight	708	46,312	285,644	6.17
	Northern Illinois.....	"	512	41,341	194,418	4.70
	Oglesby.....	"	512	40,744	204,812	5.03
	Illinois Valley.....	"	512	38,743	192,949	4.98
Iowa.	Ostolosco.....	"	241	19,590	93,950	4.80
	Crooked Creek.....	"	881	75,778	327,216	4.32

* Du Quoin. † Name of mine not stated. ‡ La Salle.

It will be seen that the evaporative capacity varies from 3.77 lbs. of water for one pound of coal for Fort Dodge, Ia., coal to 5.48 for Brazil, Ind., 5.54 for Tamaroa, Ill., and 6.32 for Carbondale, Ill., coal in passenger, and 6.17 in freight service.

The heating capacity of Fort Dodge coal is 60 per cent. of the Carbondale coal. It necessarily follows that the area of grate, capacity of furnace and extent of heating surface required for the proper combustion of Carbondale coal would prove insufficient for the Fort Dodge coal. Were a boiler proportioned, so far as grate area, size of furnace and square feet of heating surface are concerned, for Fort Dodge coal, it would have far greater capacity for generating steam if the Carbondale coal were used; the grate area could be reduced proportionately, better combustion of fuel be obtained and correspondingly less smoke emitted; which, however, would be due to the purer quality of coal used.

The less the heating capacity of coal, the greater should be the area of the heating surfaces in the boiler. Where there is insufficient heating surface in the boiler a forced combustion is necessary, or where the heating capacity of the coal is small, the boiler must be forced beyond its legitimate capacity, unless the grate area and heating surface are proportioned to suit the poor quality of coal which is being consumed.

It is a strong, though safe, assertion that there has not been built a locomotive boiler of sufficient capacity to insure proper combustion of fuel.

Size, weight and form are arbitrarily limited and bounded by the substructure and track on which the motive power moves.

With an ordinarily proportioned locomotive engine, taxed to the greatest capacity, only three-fourths as much water can be evaporated per pound of coal as with a well-proportioned stationary boiler having a good natural draft and proper area of grate for the quality of fuel used.

Irregular and careless firing serves to aggravate the evils attendant on the forced combustion necessary in locomotives, and results not only in a waste of fuel, but also in the emission of volumes of black smoke.

Your Committee urge that locomotive boilers be constructed of the largest possible capacity consistent with a proper and safe weight upon the rails. This is the first and most important element in the prevention of smoke, with due economy in the consumption of fuel.

Next in importance is careful firing. Locomotive engineers and firemen must be educated to a higher standard in this regard. As the amount of steam used varies with the loads hauled, the grade climbed or descended, and the speed attained, so also must the amount of coal consumed vary and locomotive engineers and firemen should be required to feed fuel to the boiler in proportion to the work being performed. It is a common practice for firemen to throw a large amount of coal into the furnace at one firing. That which is on top is rapidly coked by the heat underneath, and the gases generated escape unconsumed. An equal amount of coal placed in the furnace in three or four firings, at intervals of from three to five or six minutes, would in many instances evaporate twice as much water as when used in the careless manner designated, and the smoke emitted would be practically unobjectionable to the traveling public or the citizens of the various towns and villages through which our railroads run.

The admission of air above the fire is of material advantage in well-proportioned boilers, as it affords better combustion of the gases generated in the furnace and lessens the amount of smoke. An arbitrary rule, fixing the amount of air which should be thus admitted, cannot be followed.

The admission of cold air above the fire impairs the steaming powers of boilers, the capacity of which is small in proportion to the size of the cylinders.

Where boilers have large capacity, and combustion is not forced, the admission of air through tubes or hollow stay-bolts, or by any other practicable means, is beneficial.

The amount so admitted should vary with the quality of the fuel used. Coals which permits the rapid generation of gases should have a larger quantity of air than that from which gases are not so readily thrown off. Referring to the table given herein, showing the evaporative quality of different coals, it is apparent that the Fort Dodge coal, which evaporates but 3.77 lbs. of water to a pound of coal, and which does not permit the rapid generation of gases, would require the admission of but little air above the fire, while the Carbondale coal, which evaporates 6.17 lbs. of water to a pound of coal, cokes readily and emits gas rapidly, would require, in a large, well-proportioned boiler, a free admission of air to the furnace to secure proper combustion.

It is evident that where a well-proportioned boiler is taxed to its full capacity, more air is required above the fire than where it is worked to one-fourth or one-half its capacity. It is, therefore, seen that when arrangements are made to admit air, means should be provided for regulating the amount in proportion to the work done and coal consumed. Careless firing will defeat all efforts which are made toward economical consumption of coal and prevention of smoke. Large boilers, admission of air and the use of good coal will not reach the object sought if careless firing be permitted.

The money expended by railway companies in experiments with water tables, fire-brick arches, peculiar-shaped furnaces, brick walls and mid-feathers, has doubtless proved what ought not to be done.

Your committee venture the opinion that the same amount of money would have been expended to better advantage had it been used in teaching men how to fire locomotive engines.

Large boilers and fire-boxes, and careful firing are the "Best Means of Preventing Smoke from Locomotives With due Economy in Fuel."

Respectfully submitted,
E. D. JEFFERY,
H. A. TOWNE,
SANFORD KEELER, } Committee.

Transportation in Congress.

In the Senate on the 7th:

The bill to authorize the St. Paul & Chicago Short Line Company to build a bridge across Lake St. Croix was passed.

Mr. Bayard, of Delaware, presented the memorial of the Philadelphia & Reading Coal & Iron Company, and thirty-two other railroad and other corporations of Philadelphia, creditors of P. & T. Collins, railway contractors, praying relief at the hands of the United States government in relation to certain contracts made by Collins & Co. with the government of Bolivia. Also the memorial of P. & T. Collins, the contractors, for the same purpose. Referred to the Committee on Foreign Affairs.

In the House on the 10th:

Mr. Newberry, of Michigan, presented a bill extending the time for completing the Northern Pacific road for six years. It requires the company to make half-yearly returns of money expended on construction; provides that all unsold lands over and above the amount expended on the road, shall revert to the government; also, that lands mortgaged or sold for any purpose except to supply funds for construction shall be subject to taxation. Actual settlers within the limits of the grant shall have the right to buy a quarter-section each, at \$2.50 per acre.

Mr. McCoid, of Iowa, introduced a bill providing that each owner, company, or person operating a railroad engaged in commerce among the states shall, on the 1st day of March, 1881, make and publish a complete table and schedule of fees, rates, and charges, intended thereafter to be in force. Except when, for good reasons in extraordinary cases, a departure therefrom is necessary, said schedule of rates and charges, when so published, shall uniformly, impartially and invariably be charged by said operators of railways. Said rates and charges shall be divided, arranged and fixed as follows: One uniform, impartial charge for handling, loading, unloading, billing and switching; also one fixed mileage rate for hauling per car, whether the cars for each shipper be one or more. That in the operating of railways of the United States, in commerce among the states, the cardinal legal principle in the construction of the legality of the acts of said companies shall be, whether, in the several acts of the companies, such railways are being operated impartially for corporate profit from honest public service. Any acts, contracts, consolidations, discriminations, rebates, drawbacks, poolings, or extortions, which shall be against public policy and in violation of this principle, are forbidden. It prescribes penalties and punishments for violations of the act. Any company may change its schedule upon giving 30 days' notice. Section 7 provides that publication of schedules must be made by printing in plain type and pamphlet form, and posting the same in the ticket offices. Section 8 provides for the appointment by each Congress of a committee of nine, one from each United States Judicial Circuit, to be called the Committee on Supervising Railways, whose duty it shall be to examine and report, and advise whenever more efficient legislation is deemed necessary, said committee to be empowered to sit during vacations, and to take testimony.

Capt. James B. Eads has submitted to the House Committee on Inter-oceanic Canals a bill to incorporate the Inter-oceanic Transit Company to build a ship railroad, on Capt. Eads' plan, across the Isthmus of Panama. The bill provides for government supervision of the work and a government guarantee of 6 per cent. interest on not exceeding \$50,000,000 capital for 30 years.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Wabash, St. Louis & Pacific, special meeting, at the office in St. Louis, July 14.
Columbus, Chicago & Indiana Central, annual meeting, in Columbus, O., June 2.
Texas & St. Louis, deferred annual meeting, at the office in Tyler, Tex., May 18, at 10 a. m.

Annual Conventions.

Meetings of various railroad and engineering associations will be held as follows:
The Master Mechanics' Association will hold its thirteenth annual convention in Cleveland, O., beginning Tuesday, May 11. N. E. Chapman, Chairman Committee of Arrangements.
The American Society of Civil Engineers will hold its annual convention in St. Louis, Mo., beginning Tuesday, May 25. T. J. Whitman, Secretary Local Committee, St. Louis.
The Passenger Conductors' Life Insurance Company of the United States will hold its ninth annual convention at the Maxwell House, in Nashville, Tenn., beginning May 31.
The Master Car-Builders' Association will hold its fourteenth annual convention in Detroit, Mich., beginning Tuesday, June 8.
The Yard-Masters' Mutual Benefit Association, of the United States and Canada, will hold the sixth annual convention at the Revere House, Boston, Mass., beginning June 9 next.

Dividends.

Dividends have been declared as follows:
Boston, Concord & Montreal, 3 per cent., semi-annual, on preferred stock, payable May 10.
Catawissa (leased to Philadelphia & Reading), 3½ per cent., semi-annual, on the preferred stock, payable May 19.
Pennsylvania, 3 per cent., semi-annual, payable May 28.

Shareholders have the option of taking cash or scrip convertible into stock.

Cleveland & Pittsburgh (leased to Pennsylvania Company), 1½ per cent., quarterly, payable June 1.

Northern (New Hampshire), 3 per cent., semi-annual, payable June 1. This company raises from 2½ to 3 per cent.

Foreclosure Sales.

The United States Court having vacated the temporary injunction, the Dallas & Wichita road was sold in Dallas, Texas, May 4, under foreclosure of mortgage, and bought by John C. Brown, Frank S. Bond and Josiah G. Graves for \$145,000. A protest against the sale was entered on the ground that an appeal from the decree of foreclosure was pending. The land certificates (120 of 640 acres each) were sold separately to J. L. Leonard for \$3,000. The road is completed from Dallas, Tex., to Lewisville, 21 miles. It has been bought in the interest of the Texas & Pacific.

The Galveston, Brazos & Colorado road will be sold in Philadelphia, Aug. 24, at suit of the Guarantee, Trust & Safe Deposit Company, of Philadelphia, under a trust-deed given to secure \$100,000 bonds. The road is of 2-ft. gauge and extends from Galveston to Seaforth, 15 miles. Its chief employment thus far has been in hauling sand.

The sale of the Washington City, Virginia Midland & Great Southern road, which was to have taken place May 12, has been stopped by a writ of superseas granted by the Virginia Court of Appeals. The writ is returnable June 1, and the sale cannot take place before that time.

The Green Bay & Minnesota road was to have been sold April 28, but it is understood that the sale has been indefinitely postponed at the request of the bondholders.

American Society of Civil Engineers.

The Secretary has issued the following note on the coming convention at St. Louis:

"The sessions of the convention will open on Tuesday, May 25, 1880, at 10 a. m. The headquarters will be at the Lindell Hotel, where arrangements have been made to provide for those attending, at \$3 per day.

"The Committee on Transportation has not received as extended facilities as has been the case in previous years. Such arrangements as may be perfected (which will probably be not to exceed half the regular fare) will be announced by special note to those who have notified the Secretary of their intention to attend the convention. Any members desiring to attend and to avail themselves of these transportation arrangements should send word to the Secretary by return mail, if they have not previously replied to the convention circular."

Yard-Masters' Mutual Benefit Association.

Mr. George W. Evans, of Denver, Col., President of this Association, has issued the following address to members:

"It is a pleasant duty, as your presiding officer, that I issue this call for our sixth annual convention, to be held at the Revere House, Boston, Mass., on Wednesday, the 9th day of June next, at 10 o'clock, a. m.

"It is with much gratification that I report the healthy and prosperous condition of our Association; yet when I think for what purpose it was organized, it is somewhat surprising how slowly it grows. But how much more progress could we expect? The harvest so great and the laborers so few. God, in His wisdom, has seen fit to enter our ranks and take from us one of our most worthy members. While it is a sad misfortune to his bereaved family and a great loss to our Association, we should thank Him for his goodness in drafting but one from the ranks of so great a number.

"The interest manifested by you in the past, I think, justifies me in assuming that the future will not suffer for the want of your presence at this important convention, when many necessary changes in our constitution and by-laws must be made. While our cause is the noblest work God has allotted to man, yet grand as the cause and noble as the objects, our brotherhood of charity will sink into comparative nothingness unless the kindest feelings are exercised by each individual member in the selection of delegates to this convention. Earnestly desiring to impress these facts, I hereby extend a cordial invitation to all members; also, to yard-masters, ex- and assistant yard-masters, as well as general managers, superintendents, and other railway officials, to be present at our deliberations at this convention."

Meeting of Railroad Men in Chicago.

Farwell Hall, in Chicago, was well filled on the evening of May 6 at the reception of the railroad men of the city, given by the Railroad Branch of the Young Men's Christian Association.

Mr. O. S. Lyford, General Superintendent of the Chicago & Eastern Illinois Railroad, presided, and made the address of welcome. The Rev. Arthur Mitchell then offered prayer. The Chicago Quartet followed with one of their sacred pieces. Next on the programme was an address by Mr. Augustine W. Wright, who took for his subject "Extracts from the Early History of Chicago Railroads." The address was an extremely interesting one, and was received with deserved applause. This interest was increased when John Ebbert, who ran the first engine out of the city, was introduced to the audience. After music by the quartet, Mr. C. D. Roys made a pleasant address. Another quartet, then a recitative, "Asleep at the Switch," by Miss Jennie Hunter, was followed by an address by Bishop Charles E. Cheney. The quartet sang as a concluding number "I Cannot Always Trace the Way."

A number of prominent railroad men were present. A sociable and collation closed a very pleasant gathering.

ELECTIONS AND APPOINTMENTS.

Ashuelot.—At the annual meeting in Keene, N. H., May 11, the following were chosen: Directors, Henry Colony, Oscar Edwards, Tilly Haynes, E. F. Lane, F. F. Lane, A. B. Harris, J. A. Rumrill; Clerk, F. F. Lane; Treasurer, E. F. Lane; Assistant Treasurer, Seth Hunt. The road is leased to the Connecticut River Company.

Bergen County Short Line.—At the annual meeting recently the following directors were chosen: Gilbert D. Bogert, Edmund S. Bowen, Daniel Demarest, Hugh J. Jewett, John Kennel, Cortland Parker, Homer Ramsdell, Bird W. Spencer, Daniel Van Winkle. The board elected Hugh J. Jewett, President; Cortland Parker, Vice-President; Bird W. Spencer, Treasurer. The company is organized to build the proposed Erie short-cut or loop line from Boiling Spring, N. J., to Ridgewood.

Chicago & Northwestern.—Mr. J. B. Trull has been appointed Superintendent and Chas. V. R. McKinlay General Freight Agent of the Galena & Wisconsin and Chicago & Tomah branches—offices at Galena, Ill. Mr. Richard H. Wyman is appointed Division Freight Agent of the Galena Division, in place of Mr. McKinlay, transferred.

Chicago, Milwaukee & St. Paul.—Mr. John M. Egan has been appointed Superintendent of the Southern Minnesota Division of this railway. Mr. Egan has been Superintendent of the road for several years under the old management. Mr. W. H. Barron is appointed Division Freight Agent of the Southern Minnesota Division. He has been General Freight Agent of the road.

Delaware & Hudson Canal.—At the annual meeting in New York, May 11, the following managers were chosen: Thomas Dickson, Scranton, Pa.; Thomas Cornell, Rondout, N. Y.; John Jacob Astor, Legrand B. Cannon, James M. Halsted, Adolphus Hamilton, Robert S. Hone, Abiel A. Low, Levi P. Morton, James Roosevelt, James R. Taylor, Abraham R. Van Nest, George Cabot Ward. Messrs. Hamilton and Van Nest are new directors, succeeding Robert Lenox Kennedy and J. Pierpont Morgan. Probably no other board of directors in the country has so many millionaires among its members—certainly we do not remember any. The board re-elected Thomas Dickson President.

Georgia.—At the annual convention in Augusta, Ga., May 12, Mr. C. H. Phinizy was chosen President, in place of Gen. E. P. Alexander, who goes to the Louisville & Nashville. Gen. Alexander was chosen Vice-President.

Grand Trunk.—At the half-yearly meeting in London, April 29, Wm. Newmarch and Robert Gillespie were re-elected directors.

Grangeville & Antioch.—The officers of this new company are: President, Dr. A. Bradley; Directors, George H. Hackett, J. L. Sullivan, C. Talbot, F. Wyruck; Secretary and Treasurer, J. J. Doyle.

Greenville & Columbia.—Mr. J. W. Fry is appointed General Superintendent, in place of R. H. Temple, now Chief Engineer of the Richmond & Allegheny road.

Hamilton & Northwestern.—At the annual meeting in Hamilton, Ont., May 4, the following directors were chosen: James W. Barclay, P. W. Dayfoot, Edward Gurney, Wm. Hendrie, Matthew Leggett, John Proctor, John Stuart, Sir Henry Tyler, Sir Charles Young.

Houston, East & West Texas.—The following circular is dated May 1:

"E. Hulbert, having been relieved from the office of General Superintendent of this company, subordinate officers and employees will report to General Manager E. L. Bremond and receive orders from him in their respective departments."

Kentucky Railroad Commissioners.—The Governor of Kentucky has appointed as Railroad Commissioners for three years, Charles E. Kincaid, of Louisville; J. F. Johnston, of Lexington, and Charles A. Rochester, of Stanford.

Laurens.—Mr. James O. Meredith, Road-Master, is appointed Superintendent also, in place of R. H. Temple.

Louisiana & Missouri River.—The following officers have been chosen for the ensuing year: President, R. P. Tansey, St. Louis; Vice-President, Wm. King, Fulton, Mo.; Secretary and Treasurer, W. W. Pope. The road is leased to the Chicago & Alton.

Mahoning Coal Railroad.—This company last week elected D. P. Eels, President; Lewis C. Higgins, Secretary and Treasurer. The road is leased to the Lake Shore & Michigan Southern.

Manhattan Beach Co.—The officers of this company, successor to the New York & Manhattan Beach, are: President, Austin Corbin; Vice-President, J. B. Upham; Treasurer, G. S. Moulton.

Massachusetts Central.—Gen. Silas Seymour has been chosen Vice-President, a new office. He is also Consulting Engineer.

Memphis & Great Southwestern.—The officers of this new company are: President, J. B. Bowman, Lexington, Ky.; Secretary, James M. Pomeroy, Little Rock, Ark.; Treasurer, J. D. Darden, Little Rock.

Michigan Central.—At the annual meeting in Detroit, May 6, the following directors were chosen: Anson Stager, Chicago; Ashley Pond, Detroit; Wm. L. Scott, Erie, Pa.; Samuel F. Barger, Augustus Schell, Wm. H. Vanderbilt, Wm. K. Vanderbilt, Cornelius Vanderbilt, E. D. Worcester, New York. The board re-elected Wm. H. Vanderbilt, President; Cornelius Vanderbilt, Vice-President and Treasurer; E. D. Worcester, Secretary.

New York Central & Hudson River.—The following general order is dated May 3: "Mr. Wm. M. Strong having resigned as Superintendent of Motive Power of the Harlem Division, Mr. Wm. Buchanan, Superintendent of Motive Power of the Hudson River Division, will assume charge of the Harlem Division, assisted by Mr. Theodore Wheeler, who has been appointed Master Mechanic of that Division."

New York, Ontario & Western.—The position of Superintendent of Construction has been offered to Mr. James W. McCulloh, now Receiver of the New Jersey Midland, and accepted by him. He will assume the duties of the office as soon as the New Jersey Midland receivership is closed, probably by June 1. He will have charge of all new work, on the road; of the Weehawken Ferry, the tunnel from Weehawken through Bergen Hill, the connections to be made at Middletown, the proposed branch to Newburg, the Western Extension, and of the relocation and rebuilding of portions of the present main line.

New York Stock Exchange.—At the annual election, May 10, the following officers were chosen: President, Donald MacKay; Chairman, James Mitchell; Vice-Chairman, Alexander Henriques; Treasurer, D. C. Hays; Secretary, B. O. White; Trustee of Gratuity Fund, Henry Meigs; Gov. erning Committee (to serve four years), Brayton Ives, Wm. Lummis, W. B. Dickerman, A. M. Cahoon, Wm. Alex. Smith, C. K. Randall, H. H. Hollister, Wm. McClure, George H. B. Hill and A. F. R. Martin; to serve three years, E. A. Drake, Laurens Joseph and S. V. White; to serve two years, Nelson Robinson and George H. Palmer; to serve one year, R. L. Anderton, Jr.

Ohio Falls & Northwestern.—The directors of this new company are: R. B. Barbour, B. B. Carey, Frank Clarkson, Samuel Cleaver, Daniel Lane, C. L. Matthews, D. T. Whitcomb, James Worrell.

Oregon Railway.—The following officers have been chosen: President and General Manager, Wm. Reid; Vice-President, Donald Macleay; Treasurer and Accountant, Robert Bell. Offices in Portland, Oregon.

Philadelphia & Reading.—Mr. J. Lowrie Bell, heretofore General Freight Agent, has been appointed General Traffic Manager. He will have charge of all questions relating to rates on coal hereafter, as well as on general merchandise.

Shenandoah Valley.—At the annual meeting in Winchester, Va., May 5, the following directors were chosen: David Billmyer, A. R. Boteler, H. B. Davenport, Logan Osborn, Wm. H. Travers, Jefferson County, W. Va.; John T. Lovell, Warren County, Va.; Wm. Milnes, Jr., Mann Spitzer, Page County, Va.; H. B. Harnsberger, Rockingham County, Va.; U. L. Boyce, Wm. D. Smith, Clarke County, Va.; A. Boyd, Philadelphia. The board re-elected Wm. Milnes, Jr., President; U. L. Boyce, Vice-President; J. T. Wright, Secretary.

South Pacific Coast.—Capt. R. M. Garrett has been appointed General Freight Agent. He was formerly with the Southern Pacific.

Springfield & Northeastern.—At the annual meeting held

May 11 the following directors were chosen: S. P. Bailey, W. K. Baker, Chester W. Chapin, Chester W. Chapin, Jr., R. W. Chapin, W. B. Kimball, Willis Phelps, James A. Rumrill, R. D. Woods. The board elected Willis Phelps President; W. K. Baker, Clerk and Treasurer.

Union Railway, of Indianapolis.—At a meeting of the directors, held May 7, Horace Scott was re-elected President; Wm. Jackson, Secretary; John E. Simpson, John F. Miller, C. C. Gale, J. W. Sherwood, E. W. McKenna, Executive Committee. The company owns the Union Depot in Indianapolis and its approaches.

Washington, Cincinnati & St. Louis.—At a recent meeting T. W. F. Allemon was chosen President and J. S. Loose Vice-President. Address of both is Bridgewater, Va.

PERSONAL.

—Mr. William M. Strong has resigned his position as Master Mechanic of the Harlem Division of the New York Central & Hudson River Road, after faithful service of many years.

—Mr. John Welty, a director of the Western Maryland Company, and a rich farmer and distiller of Washington County, Md., died suddenly May 6 at his residence near Hagerstown.

—Mr. Benjamin P. Cheney, of Boston, well-known as a large owner of Western railroad property and a director of several companies, has given \$50,000 to Dartmouth College, most of which will probably be used to endow a professorship of mathematics.

—A faithful man is Denis Colgan, who has been tender of the draw-bridge at Bridgeport, Conn., on the New York, New Haven & Hartford road ever since it was built, about 30 years ago, and in all that time has never been away from his post more than half a day at a time.

—Mr. W. L. Fox, President and chief owner of the Foxburg, St. Petersburg & Clarion and the Emlenton, Shippensburg & Clarion roads, died very suddenly a few days since, from over-exertion in running to catch a train. He was also a large owner of oil property and of storage-tanks. He was only 25 years old, having inherited most of his property from his father.

TRAFFIC AND EARNINGS.

Coal Movement.

Anthracite tonnages reported for the four months ending April 30 were as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Phila. & Reading.....	1,721,926	2,097,142	D. 375,216	17.9
Northern Central, Shamokin Div., and Summit Br.'s R. R.....	226,330	228,191	D. 1,861	0.8
Sunbury, Hazleton & Wilkesbarre.....	4,831	8,574	D. 3,743	43.5
Pennsylvania Canal.....	44,716		I. 44,716	
Central of N. J., Lehigh Div.....	1,103,050	1,181,172	D. 78,122	6.6
Lehigh Valley.....	1,243,758	1,151,344	I. 92,414	8.0
Pennsylvania & N. Y. Del., Lacka. & West-ern.....	6,735	5,290	I. 1,445	27.1
Del. & Hudson Canal.....	1,084,021	1,043,752	I. 40,269	3.9
Co.....	1,018,528	806,238	I. 122,288	13.6
Penna. Coal Co.....	284,849	392,273	D. 107,424	27.4
State Line & Sullivan.....	15,041	16,977	D. 1,936	11.4
Total anthracite.....	6,753,492	7,021,164	D. 267,672	3.8

The anthracite trade is quite quiet, as usual at this season, but prices are well maintained.

The anthracite tonnage of the Belvidere Division, Pennsylvania Railroad, for the four months was as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Coal Port for shipment.....	5,850		I. 5,850	
South Amboy for shipment.....	131,977	145,767	D. 13,790	9.5
Local distribution on N. J. lines.....	101,013	100,979	I. 34	46.4
Co.'s use on N. J. lines.....	34,641	29,356	I. 5,285	18.0
Total.....	333,481	285,102	I. 48,379	17.0

Of the total this year 261,124 tons were from the Lehigh, and 72,357 tons from the Wyoming Region.

Actual tonnage of anthracite passing over the Pennsylvania & New York road for the five months of its fiscal year from Dec. 1 to May 1 was: 1880, 268,034; 1879, 335,459; decrease, 67,425 tons, or 20.1 per cent.

Semi-bituminous tonnages for the four months, are reported as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Cumberland, all lines.....	596,753	418,741	I. 178,012	42.5
Huntingdon & B'd Top.....	77,950	47,378	I. 30,572	64.5
East Broad Top.....	27,309	22,035	I. 5,274	22.0
Tyrone & Clearfield.....	388,755	477,086	D. 88,331	18.5
Belleville & Snowshoe.....	26,116	12,035	I. 14,081	117.3

Total, semi-bituminous, 1,116,892 977,275 I. 139,617 14.3

The Clearfield mines are slowly resuming, chiefly by the introduction of new men. The distribution of Cumberland tonnage for the four months, was as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Baltimore & Ohio R. R.....	459,345	282,855	I. 176,490	62.4
Bedford Div. Pa. R. R.....	69,635	53,894	I. 15,741	29.4
Chesapeake & Ohio Canal.....	63,354	77,575	D. 14,221	18.3

Total, 462,335 414,324 I. 178,011 43.0

Local consumption will account for the small difference in the total from the figures given above, which are the total shipments over the Cumberland & Pennsylvania road and Cumberland Branch. Prices for Cumberland coal are still very low and rates on the canal are unsettled. The companies are offering \$1 per ton from Cumberland to Georgetown, but the boatmen want more.

Actual tonnage passing over the Huntingdon & Broad Top road for the four months was:

	1880.	1879.	Inc. or Dec.	P. c.
Broad Top coal.....	77,950	47,378	I. 30,572	64.5
Cumberland coal.....	80,034	59,214	I. 20,820	35.2
Total.....	157,984	106,592	I. 51,401	48.2

The Broad Top coal is mined on the line; the Cumberland is carried through from Mt. Dallas to Huntingdon.

Bituminous tonnages for the four months were:

	1880.	1879.	Inc. or Dec.	P. c.
Barclay R. R. & Coal Co.....	151,363	123,887	I. 27,476	22.1
Allegheny Region, Penn. R. R.....	124,860	58,809	I. 66,051	112.0
Penn. & Westmoreland.....	391,161	294,474	I. 96,687	47.9
West Penn. R. R.....	98,783	66,040	I. 32,743	49.7
Southwest Penn. R. R.....	22,455	12,412	I. 10,043	81.0
Pittsburgh Region, Penn. R. R.....	160,859	134,373	I. 26,486	26.4
Total.....	958,481	690,085	I. 268,396	45.2

The bituminous trade of Central and Western Pennsylvania shows a great increase this year, largely due to the improved demand from the iron furnaces and rolling mills.

The April rise in the Ohio took out from Pittsburgh, boats

loaded with 6,600,000 bushels (about 250,800 short tons) of coal bound to Cincinnati, Louisville and other river points.

Coke tonnages reported for the four months are as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Snowshoe and Clearfield.....	215	215		
Allegheny Region, Pa. R. R.....	22,108	15,367	I. 6,741	43.8
Penn. and Westmoreland.....	46,227	27,888	I. 18,339	65.9
West Penn. R. R.....	33,722	31,865	I. 1,857	5.9
Southwest Penn. R. R.....	344,381	264,019	I. 80,362	30.4
Pittsburgh Region, Pa. R. R.....	183,547	51,034	I. 132,513	259.8
Total coke.....	630,270	390,173	I. 240,097	61.5

Prices of coke have been seriously affected by the great increase in production, and the temporary falling off in demand for the iron trade. The number of coke ovens now in the Connellsville and Pittsburgh regions is nearly double that of a year ago.

Railroad Earnings.

Earnings for various periods have been reported as follows:

	1879-80.	1878-79.	Inc. or Dec.	P. c.
Og. & Lake Champlain.....	\$510,582	\$479,277	I. \$31,305	6.5
Net earnings.....	132,359	90,407	I. 41,952	46.4

Four months ending April 30:

	1880.	1879.	Inc. or Dec.	P. c.
Atchison, Top. & S. F.....	\$2,177,500	\$1,735,268	I. \$442,232	25.5
Bur. Cedar Rap. & No.....	679,464	426,095	I. 253,369	59.2
Central Pacific.....	4,982,614	4,632,730	I. 349,884	7.5
Chi. & Alton.....	2,184,867	1,314,182	I. 870,685	66.2
Chi. Mil. & St. P.....	3,274,000	2,379,178	I. 894,822	37.6
Chi. & Northwest-ern.....	4,924,592	4,133,880	I. 790,712	19.1
Chi. St. Paul & Minn.....	395,041	319,765	I. 75,276	23.5
Col. & Ind.....	1,481,843	1,128,917	I. 352,926	31.3
Detroit, Lau. & Nor.....	373,044	292,024	I. 81,020	27.7
Flint & Pere Mar-quette.....	505,770	355,480	I. 150,291	42.3
Grand Trunk.....	3,257,331	2,829,824	I. 427,507	15.1
Han. & St. Jo.....	750,031	651,428	I. 98,603	15.1
Ill. Cent. & Ind.....	1,781,783	1,622,057	I. 159,726	9.8
Iowa.....	502,150	448,907	I. 53,243	12.1
Int. & Gt. North-ern.....	519,678	511,964	I. 7,714	1.5
Little Rock & Ft. Smith.....	148,747	91,751	I. 56,996	62.0
Louisville & Nash-ville.....	2,411,573	1,698,766	I. 712,807	42.0
Mo. Kansas & Texas.....	1,399,083	803,084	I. 595,999	74.2
Mobile & Ohio.....	750,440	648,378	I. 102,062	17.3
N. Y. Central & Hud. River.....	10,548,003	8,924,134	I. 1,623,869	18.2
Northern Pacific.....	441,062	306,303	I. 134,759	44.0
North Wisconsin.....	63,582	28,298	I. 35,284	124.8
St. L. A. & T. H.....	414,860	267,868	I. 146,992	54.9
St. L. A. & T. H. & Ind.....	205,710	178,867	I. 26,843	75.0
St. L. & San Fran-cisco.....	707,312	344,480	I. 362,832	122.7
St. Paul & Sioux City.....	429,600	322,864	I. 106,736	33.1
Scioto Valley.....	90,221	86,908	I. 3,313	3.7
Toledo, Peoria & Warsaw.....	419,102	376,162	I. 42,940	11.4
Wabash, St. L. & P.....	3,415,023	2,431,554	I. 983,469	40.5

Three months ending March 31:

	1880.	1879.	Inc. or Dec.	P. c.
N. Y. Lake Erie & Western.....	\$4,193,557	\$3,711,043	I. \$482,514	13.0
Net earnings.....	1,455,351	870,231	I. 585,120	64.9

Month of February:

	1880.	1879.	Inc. or Dec.	P. c.
Col. Chi. & Ind. Central.....	\$350,799			
Net earnings.....	70,673			

Month of March:

	1880.	1879.	Inc. or Dec.	P. c.
Cal. Har. & San Antonio.....	\$81,011	\$106,619	D. \$25,608	24.0
N. Y. Lake Erie & Western.....	1,044,958	1,356,779	D. 311,821	21.2
Net earnings.....	742,931	411,774	I. 331,157	80.4

N. Y. & New England.....

	1880.	1879.	Inc. or Dec.	P. c.
Net earnings.....	183,845	151,737	I. 32,108	21.0
	69,483	55,161	I. 14,322	26.0

Month of April:

	1880.	1879.	Inc. or Dec.	P. c.
Atchison, Top. & Santa Fe.....	\$692,000	\$542,801	I. \$149,199	27.5
Bur. Cedar Rap. & No.....	141,652	100,132	I. 41,520	41.4
Central Pacific.....	1,374,000	1,406,600	D. 32,600	2.3
Chi. & Alton.....	597,320	393,393	I. 203,927	51.8
Chi. Mil. & St. Paul.....	871,000	678,439	I. 192,561	28.4
Chi. & Northwest-ern.....	1,270,552	1,128,894	I. 141,658	13.1
Chi. St. Paul & Minn.....	119,126	91,913	I. 27,213	29.6
Cleve. Col. & Ind. & Lansing.....	345,199	271,627	I. 73,572	27.1
Det. & Pere Mar-quette.....	102,061	88,049	I. 14,012	15.9
Flint & Pere Mar-quette.....	102,129	128,611	D. 26,482	28.1
Georgia.....	81,000	70,000	I. 11,000	15.7
Hann. & St. Jo.....	200,059	165,444	I. 34,615	20.9
Ill. Cent. & Ind. lines.....	426,550	378,339	I. 48,211	12.7
Iowa.....	117,020	114,252	I. 2,768	2.4
Int. & Gt. North-ern.....	104,000	80,540	I. 23,460	29.3
Little Rock & Fort Smith.....	26,601	19,740	I. 6,861	34.1
Louisville & Nash-ville.....	557,083	390,083	I. 167,000	42.8
Missouri, Kansas & Texas.....	348,275	189,217	I. 159,058	84.1
Mt. Vernon & Ohio.....	137,350	119,404	I. 17,946	14.9
N. Y. Central & Hudson River.....	2,782,324	2,214,626	I. 567,698	25.6
Northern Pacific.....	183,227	115,656	I. 67,571	58.4
North Wisconsin.....	8,521	5,871	I. 2,650	44.9
St. L. A. & T. H.....	105,853	70,262	I. 35,591	50.6
Main Line.....	45,900	41,331	I. 4,569	11.3
St. L. A. & T. H. & Ind.....	174,503	83,736	I. 90,767	108.4
St. Paul & Sioux City.....	115,509	87,965	I. 27,544	31.4
Scioto Valley.....	20,453	21,262	D. 809	3.8
Toledo, Peoria & Warsaw.....	92,342	112,374	D. 20,032	17.9
Wabash, St. L. & P.....	890,137	609,278	I. 280,859	46.1
Grand Trunk.....	\$181,138	\$155,859	I. \$25,279	16.2

Week ending May 1:

	1880.	1879.	Inc. or Dec.	P. c.
Grand Trunk.....	\$181,138	\$155,859	I. \$25,279	16.2

Petroleum Exports.

The exports of petroleum, in gallons, for the four months from Jan. 1 to May 1, for five years have been:

	1880.	1879.	1878.	1877.	1876.
108,897,870	88,488,702	72,612,930	83,120,466	69,137,297	

This year the exports are 23 per cent. more than in 1879, and 50 per cent. more than in 1876. The increase has been almost wholly at New York, which exported nearly 40 per

cent. more than last year and 79 per cent. of the whole exports, against 71 per cent. last year. There is a small increase (4½ per cent.) at Philadelphia and a large decrease (33.7 per cent.) at Baltimore, which this year has but one-twentieth of the whole.

Grain Movement.

For the week ending May 1, receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and receipts at the seven Atlantic ports, have been, in bushels, for the past seven years:

	Northwestern	Northwestern shipments.			
Year.	receipts.	Total.	By rail.	P. c.	Atlantic receipts.
1874.....	3,521,942	3,775,478	1,169,071	31.0	1,908,480
1875.....	2,735,207	2,540,262	1,075,243	42.3	2,174,007
1876.....	3,055,911	3,737,824	2,292,633	46.3	3,008,508
1877.....	3,390,193	4,521,713	1,341,677	29.7	2,196,090
1878.....	4,834,507	4,591,346	1,056,155	23.0	3,900,700
1879.....	4,297,006	4,558,360	2,931,082	64.3	4,023,227
1880.....	3,750,407	4,361,732	1,159,339	26.6	4,242,930

City having been condemned on account of age. Frank Billings, an experienced and excellent engineer, will have charge of the new locomotive, and Alex. Brown will act as his fireman. No. 20 will be set at work immediately hauling freight trains, and after she has been run 1,500 miles to get her machinery in good working condition, she will enter the passenger service.—*Jackson (Mich.) Patriot.*

The Jackson & Sharp Co., at Wilmington, Del., has lately turned out several first-class passenger coaches for the Denver, South Park & Pacific road.

Iron and Manufacturing Notes.

The Western Iron Association has reduced card rates on bar iron from 3.2 to 2.5 cents per pound.

Messrs. Blackmer & Post, of St. Louis, have recently contracted to furnish 3,000 extra thick sewer-pipe, 21 and 24 in. diameter, to the Texas & Pacific Company. They are to be used for culverts on the line of the road west of Ft. Worth.

The firm of Hoopes & Townsend was dissolved on Jan. 23, 1879, by the death of S. Sharpless Townsend. Mr. Barton Hoopes, surviving partner, having purchased the interest of the estate, will continue the business under the same firm name. Clement R. Hoopes and Barton Hoopes, Jr., are admitted to an interest in the business, and James M. Hibbs is appointed to the position of Business Manager.

The Rhea Iron Co. has been organized to work some newly discovered iron-ore beds in Rhea County, Tenn., and to build a blast furnace at Spring City. The incorporators are W. T. Gass, W. F. Sanks, B. F. Shelow, W. P. Darwin, J. D. Roberts, D. E. Rees and E. C. Carpenter.

The Etna Furnace property in Hickman County, Tenn., has been sold by the administrator for \$40,000, and the sale confirmed by the Court. The purchasers are E. W. Cole, G. M. Fogg, Vernon K. Stevenson, M. T. Polk, J. L. Gaines and L. S. Goodrich.

The Shenango Furnaces, at Middlesex, Pa., have been leased to the Emmett Mining Co.

The Franklin Iron Works, at Port Carbon, Pa., are running full double turn.

W. D. Lee and associates purpose building a large blast furnace on the Herrold Iron estate at Floodwood, O., on the Columbus & Hocking Valley road.

Union Forge, in Lebanon County, Pa., is working full time. Another steam-hammer is to be added, to make car-axes.

Wampum Furnace, near New Castle, Pa., went into blast last week.

The Nelson Iron & Coal Co., a new organization, has put in blast the furnace at Shoals, Ind., which has been idle for several years.

The Roane Iron Co., at Chattanooga, Tenn., has chosen Mr. Chamberlain President, in place of Mr. Rathburn, resigned. Mr. H. C. Evans succeeds Mr. Chamberlain as Vice-President.

The Duquesne Forge of Miller & Lloyd, in Pittsburgh, has just completed a shaft 10½ in. diameter with a double crank for an ocean steamer. It weighed about five tons.

Mr. Kloman, of the Superior Rail Mill, in rolling 30-lb. steel rails from seven-inch-square blooms by first re-blooming the blooms to about five inches square and cutting into two lengths, reheating and then rolling out into 30-foot rails, found that through loss by oxidation and crop ends the rails were apt to run short. In order to obviate this he made the experiment of rolling the rails in 60-foot lengths direct from a 7 ft. 7 in. bloom, weighing 650 lb., and after a little trouble and some few changes he succeeded in rolling the rails in that length, and he is now rolling them all in this manner with only one heating. All the work is done on the old iron-rail mill and with two roughing rolls made for rolling iron. The Corliss engine is run at an average speed of 95 revolutions per minute, and, working night and day, about 120 tons of finished rails are produced per day.—*Pittsburgh American Manufacturer.*

Bridge Notes.

The Central Bridge Co., of New York, has just completed 10 spans of iron truss bridge for the Kansas City, St. Joseph & Council Bluffs, and is at work on 10 spans for the Chicago, Rock Island & Pacific; 18 spans for the Southern Kansas & Western; 1 draw-span (150 ft.) and two fixed spans for the Long Island road; one span of 140 ft., and one of 160 ft. over the Kennebec River at Skowhegan on the Maine Central road.

Prices of Rails.

Prices of steel rails are unsettled and sales are reported at from \$70 to \$75 per ton at mill. Foreign rails are said to have been offered at \$67.50 in Philadelphia.

Iron rails are quiet, with light sales. Some large transactions in foreign rails are reported as under negotiation. Quotations are from \$55 to \$56 per ton at mill, for heavy sections, but probably a lower cash offer would be accepted.

Old iron rails are still declining, and sales are reported at \$29 to \$30, with light demand.

Duplex Tickets.

The American Duplex Ticket Company, of New York, issue a "spring style" circular with a number of new forms of the duplex tickets which are now very widely used. Besides ordinary tickets to be given by conductors, these specimens include half-fare tickets, special excursion tickets, receipts to commuters who have left their tickets at home, stop-over checks and others of the many forms required in the daily business of a railroad. In all are preserved the special principle of the duplex ticket, the two halves, one to be given to the passenger and returned to the company, the other to be retained by the conductor, the two forming mutual checks and vouchers. Among the new applications of the principle are a baggage and freight check for the Pittsburgh Southern, showing nature of articles, amount paid, etc., and the shipper's half forming a check or receipt to be delivered on receipt of the goods at destination. Another is a grain warehouse check for the Lake Shore road, which must be extremely convenient where a large business is done. On it the warehouseman can punch off in a minute the date, kind and amount of grain received, to be entered afterwards at his leisure on the books, while the shipper exchanges his half-check for a receipt, and it forms a voucher for the warehouse books. These duplex tickets, in some of their forms are now in use on roads all over the United States and Canada.

OLD AND NEW ROADS.

Baltimore & Ohio.—This company will begin running a special New York train from Chicago, May 23, leaving at 5.15, at the same time with the Atlantic express trains on the other roads, and arriving in New York but little later than they, though the distance is about 130 miles longer than the shortest of the other routes. The connection from Philadelphia will be by the Bound Brook route.

Bellaire & Southwestern.—President Mooney has made a statement to the stockholders showing the condition of this company, which states that the stock subscriptions

amounted to \$234,700. The receipts and disbursements have been as follows:

Stock paid in.....	\$167,121.67
Net proceeds of \$250,000 bonds.....	202,557.07
Receipts from road.....	17,858.24
Total.....	\$387,536.98
Cost of road and equipment.....	\$404,125.14
Working expenses of road.....	19,981.39
Interest and discount.....	20,907.77
Sundry accounts.....	4,584.30
	449,598.60

Balance, floating debt..... \$62,061.62

To offset this there are stock subscriptions which can be collected and real estate not needed, which can be sold; these will reduce the floating debt to about \$46,000. On the other hand, about \$15,000 are needed to pay for ballasting, telegraph line, new equipment and engine-house, making \$61,000 to be provided. To meet this it is proposed to issue \$75,000 second-mortgage bonds, making the total debt \$325,000, and the yearly interest \$19,500. This, it is believed, the road can easily provide for, and stockholders are urged to take these bonds in order to place the company in a safe position. The road has cost about \$11,000 per mile, but, at present prices, it would take nearly one-third more to build it.

Burlington, Cedar Rapids & Northern.—Surveys are being made for an extension of the Pacific Division beyond its present terminus at Holland, Ia., to a point not yet fully decided on.

California Railroad Commission.—The new Railroad Commission of California is now fully organized. At a meeting held in San Francisco, May 4, it was resolved to proceed at once to investigate the existing rates on passenger and freight traffic, and for that purpose to hold meetings at all the chief transportation points in the state, giving hearing to local shippers, railroad officers and others interested. It was decided to hold the first meeting at Colton, in San Bernardino County, giving two weeks' public notice thereof, in order that all interested parties may be able to attend.

Chicago & Iowa.—The Court has directed the Receiver to apply the money now on hand to the payment of overdue coupons on the second-mortgage bonds.

Chicago & Northwestern.—The Milwaukee *Sentinel* reports that President Keep has promised a delegation from that city that the company will build the proposed line from Milwaukee by Waukesha and Jefferson to Madison this season, provided the right of way from Milwaukee to the county line, about 12 miles, is given. Steps are to be taken at once to secure it. The line will be south of the Chicago, Milwaukee & St. Paul's road between Milwaukee and Madison.

Concord.—It is reported that the Old Colony Company has secured a controlling interest in the stock of this company, and purposes securing a share of the northern business through its Framingham & Lowell Branch. The Nashua & Lowell would probably be willing to come into any arrangement between the two companies.

Denver & Rio Grande.—Track on the Leadville Extension is now laid to the South Arkansas, 60 miles from the old terminus at Canon City, Col., leaving about 40 miles to reach Leadville. Nearly all this distance is graded. Of the track now complete, 22 miles were laid by the Atchison, Topeka & Santa Fe before that company's work was stopped by litigation.

Detroit, Mackinac & Marquette.—The contract for grading 60 miles of this road has been let to J. D. McDonald of Detroit. The entire line is now under contract.

Evansville, Terre Haute & Chicago.—This road was transferred to the Chicago & Eastern Illinois Company May 1, under the lease concluded some months since.

Grand Trunk.—This company has issued its usual summer programme for round-trips from Chicago to the East at reduced rates—a business which it has cultivated particularly. The round-trip rates from Chicago are: Toronto and return, \$22; Montreal, \$33; Rutland, Burlington or Bellows' Falls, \$35; Boston, \$38; Portland, \$36. These tickets are good till Nov. 1, and are much used by Western people visiting the White Mountains or New England.

Grangeville & Antioch.—This company has been organized to build a railroad on the James single-track plan from Graysonville, in Stanislaus County, Cal., to a point near the mouth of the San Joaquin River, a distance of 35 miles. If successful, it is to be extended up the San Joaquin Valley.

Grinnell & Montezuma.—Arrangements are being made to extend this road from Montezuma, Ia., to What Cheer, about 30 miles. At What Cheer it will connect with the Burlington, Cedar Rapids & Northern, and will reach a large coal district.

Hartford & Connecticut Valley.—This company is making surveys for an extension from Hartford to Springfield on the west side of the Connecticut. If built, this extension will be the third line between Springfield and Hartford.

Kansas City, Lawrence & Southern.—This company offers to its stockholders, for the purpose of building an extension of 40 miles, \$272,500 stock and \$545,000 bonds of the Southern Kansas & Western Company. The stock will be sold at par, the bonds at 40; but they will only be sold in blocks of \$500 stock and \$1,000 bonds together. The company also offers to its stockholders, for the purpose of building a branch 21 miles long, \$210,000 stock and \$300,000 bonds of the Sumner County Railroad Company, the stock at par and the bonds at 20; but every one taking \$1,000 bonds must take also \$700 in stock. Both roads will be leased by the Kansas City, Lawrence & Southern Company. The option of subscribing will remain open until May 24.

Kansas City, St. Joseph & Council Bluffs.—The following additional circular is dated May 8:

"Referring to circular of April 7, 1880, holders of Kansas City, St. Joseph & Council Bluffs Railroad Company's stock, Kansas City, St. Joseph & Council Bluffs Railroad Company's registered income bonds, Nodaway Valley Railroad Company's stock and Tarkio Valley Railroad Company's stock, are hereby notified that the Chicago, Burlington & Quincy Railroad Company, the purchaser referred to in said circular, has exercised the option given to it, and will pay, for the above-named stocks at \$72.50 per share, and for the above-named registered income bonds at 90 per cent., flat, in stock of the Chicago, Burlington & Quincy Railroad Company at \$125 per share, and will give receipts therefor upon surrender of the securities at the Chicago, Burlington & Quincy Railroad Company's office, No. 49 Sears Building, Boston, at any time between May 12 and Aug. 1, 1880, at noon, which receipts will be exchangeable for the Chicago, Burlington & Quincy Railroad Company's stock, on and after June 15, 1880, until Aug. 1, 1880, at noon.

"To secure the June 15, 1880, dividend upon the Chicago,

Burlington & Quincy Railroad Company's stock, it is necessary to surrender the above-named securities on or before May 29, 1880."

Lookout Mountain Narrow-Gauge.—This company has been organized to build a narrow-gauge road about seven miles long from Chattanooga, Tenn., to the point of Lookout Mountain. It is intended for suburban and pleasure travel. This company must not be confounded with the Lookout Mountain Railroad Company, which has just begun to build a line from Chattanooga to Rome.

Louisville & Nashville.—A circular from this company gives notice of the merging of the Union Express Co., and that the express department of the road will be known as the "Louisville & Nashville Railroad Company's Express Bureau."

The following circular from General Manager de Funiak is dated May 1:

"On the 8th day of May next, this company will take official possession of the Mobile, New Orleans & Texas Railroad. The jurisdiction of all general officers of the Louisville & Nashville Railroad Company is hereby extended over that line.

"During this month the existing system of accounts will be kept up on that road, and our system and organization fully put into effect on the 1st day of June next."

Louisiana Western.—Track is now laid to the Mermentau River, 66 miles eastward from Orange, Tex., and work has been begun on the bridge over the Mermentau. Track-laying is also in progress from Vermilionville, La., westward, and six miles of iron were down at latest reports, leaving only about 30 miles to be laid to finish the road.

Memphis & Great Southwestern.—This company has been organized to build a railroad from Hopefield, Ark., on the Mississippi, opposite Memphis, to Pine Bluff, and thence to Jefferson, Tex., with branches to Shreveport and Texarkana. For the present the company will content itself with building a few miles of road between Pine Bluff and Walnut Hill.

Minneapolis & St. Louis.—Track-laying is now progressing rapidly on the Ft. Dodge extension, and the road will soon be finished to Britt, Ia., 16 miles beyond the winter terminus at Forest City.

Work is in progress on the branch to Lake Minnetonka, and the company expects to run trains from Minneapolis to the lake by July.

New Jersey Midland.—The Receivers have now their business all closed up and their accounts ready for settlement and only await an order from the Chancellor to transfer the road to the new company. The transfer will probably be made by June 1, at the latest. The new company will take possession under unusually favorable circumstances. Five years ago, when the Receivers were appointed, the road was completely broken down, in such miserable condition as to be hardly safe for trains, such business as it had gathered had been almost driven away, and the scanty equipment was in danger of being lost altogether. The Receivers have put the road into excellent condition, renewing the track, building bridges, ballasting, filling in trestles, and making many other improvements; have secured and paid for sufficient equipment, and have, by careful management, consolidated and increased the business of the road. All this has been done without leaving any burden upon it, the certificates authorized to meet immediate necessities soon after the beginning of the trust, having been all paid off from the net earnings, so that the new company will receive the property in excellent order and free from incumbrances.

One of the Receivers, Hon. G. A. Hobart, will remain as President of the new company. The other, Mr. James W. McCulloch, goes to the New York, Ontario & Western, as noted elsewhere.

New York & Manhattan Beach.—This company, the Manhattan Beach Improvement Company and the Marine Railway Company have been consolidated into one corporation, known as the Manhattan Beach Company. The new company now owns both the railroad and all the improvements, hotels, etc., at its terminus. The new company has \$200,000 preferred and \$5,000,000 common stock; \$1,400,000 bonds issued and \$400,000 more which will be issued.

New York Central & Hudson River.—This company's statement shows for the seven months of its fiscal year from Oct. 1 to April 30, gross earnings of \$19,094,640.46, being an increase of \$2,594,718.55, or 15.7 per cent., over last year. The increase is almost entirely in freight.

New York, Lake Erie & Western.—This company makes the following statement for the half year from Oct. 1 to March 31:

	1879-80.	1878-79.	Increase.	P. c.
Gross earnings	\$8,821,334.40	\$7,772,023.00	\$1,049,311.40	13.5
Expenses	5,702,315.43	5,458,497.40	243,818.03	5.5
Net earn.	\$3,059,018.97	\$2,313,525.60	\$745,493.37	32.2
Percent of expenses	65.32	70.23		

The large new elevator in Jersey City is now nearly finished, and rapid progress is being made with the other terminal improvements there.

New York, Pennsylvania & Ohio.—This company has concluded new leases of the Cleveland & Mahoning Valley road, including the Niles & New Lisbon and the Liberty & Vienna branches, as was made necessary by the reorganization and the formation of the new company. The rental to be paid is somewhat reduced; it will be at the rate of \$357,000 a year for four and one-half years, and \$412,000 thereafter.

Ohio Falls & Northwestern.—This company has filed articles of incorporation in Indiana for a pretty extensive narrow-gauge road. The proposed line will begin at a point on the Ohio River near the Ohio Falls, and run north and northwest to Chicago, passing through Clark, Washington, Floyd, Orange, Martin, Daviess, Green, Clay, Parke, Fountain, Warren, Benton, Jasper, Newton, Porter and Lake counties of Indiana, and cross into Illinois at a point on Lake Michigan. The road will have a branch line running from Parke County to Indianapolis; one from Martin County to Vincennes; one from Clay County to Terre Haute; another from Attica to LaFayette; another from Martin County to Bedford. The capital stock is fixed at \$3,000,000.

Peninsular, of Florida.—Work is now in progress on the extension of this road across the east end of Orange Lake. The engineers are now locating the extension from Orange Lake toward Ocala.

Pennsylvania.—At the meeting of the board in Philadelphia, May 5, the committee (consisting of five of the oldest directors) to which Col. Scott's resignation had been referred, presented the following, which was unanimously adopted:

"The special committee to whom the board referred on the 1st instant the letter of Mr. Thomas A. Scott, tendering his resignation as President and one of the directors of this company, have given it that consideration which the gravity and importance of the communication demand. The pro-

posed severance of his official relations with this company is an event of deep moment in its history. He has occupied, during the whole period of his active manhood positions of trust and honor, including the highest, in its service, and covering all but a few years of its entire corporate existence. Entering upon his first duties when the company owned but an uncompleted highway between Harrisburg and Pittsburgh, he leaves it at a period when it shares, through its connections, the traffic of the most popular areas of the continent. So justly appreciated are the services thus rendered we are sure we express the sentiment, not only of the board of directors, but of the entire body of shareholders, when we say that they cordially joined in the hope cherished, and so reluctantly relinquished by him, that he would be able to continue in the service of the company during the residue of his life, and that they also deeply regret that this hope cannot be realized. Much as we deplore the loss of his great abilities and experience in the councils and in the active duties of administration of the affairs of the company, we grieve much more at the necessity which prompts his resignation. That it is a necessity we need no other assurance than that he, whose life has been one of supreme devotion to the interests of the company, has himself recognized and so feelingly communicated it to the board. Keen as are his regrets at severing these relations, his associates in office feel it as keenly, for they deem it not improper to place upon record that his personal association with them has inspired an affection for the man as sincere as the admiration which they entertain for his achievements as an officer. This is not the appropriate place for a review of his labors and sacrifices, or of the results achieved through them in the interests, not alone of the Pennsylvania Railroad Company, but of the entire country. They will make a large portion of the history of the road when it shall be written. We feel that our present duty is performed in recognizing the necessity which leaves the board of directors no alternative but an acceptance of Mr. Scott's resignation, to take effect at the date named by him. In doing this we express the hope that relief from the exacting cares and responsibilities which have weighed so heavily upon him in the past will restore him to his wonted health and fit him for many years of future usefulness. We recommend the acceptance of the offer he has so thoughtfully made, to render in his retirement such aid as he can in maintaining the high degree of prosperity now enjoyed by the corporation, and to which his own labors have so much contributed, deeming it appropriate that that aid should be rendered by him in such manner and under such circumstances as may be most agreeable to himself. We express to him the assurance that he will leave his official position accompanied by the warmest wishes of the directors, officers and others engaged in the service of this company, for his continued welfare.

"It is not necessary to repeat in formal resolutions the sentiments already expressed, and we offer for adoption the following: First—That the resignation tendered by Mr. Thomas A. Scott of the office of President and director of this company to take effect on the first day of June next, be and is hereby accepted: Second—That this report and the resolution be placed at length upon the minutes of the company, and a certified copy thereof, properly engrossed, be communicated to Mr. Scott by the Secretary."

Shenandoah Valley.—At the annual meeting held May 5, a committee was appointed to consider the question of a branch to Winchester from Berryville or Boyceville.

President Milnes presented a report containing the following statements as to the condition of the road:

"This road is now completed and equipped and in active operation from Shepherdstown to Bentonville—a distance of 56 miles. Upon the work between Shepherdstown and Hagerstown the bridge across the Potomac is nearing completion, and the grading will be completed during the present month; the work of laying the track and ballasting will be commenced immediately, and it is confidently expected that this portion of the road will be ready for operation before the first of July.

"Between Bentonville and the Shenandoah Iron Works, a distance of 35 miles, the grading and masonry will be about completed during the present month; tracklaying is now progressing southward from Bentonville, and new road will be put in operation as each important point is reached.

"It is expected that the road will be completed to the Shenandoah Iron Works during the month of September. In the mean time the work of construction is progressing between the Iron Works and Waynesboro', and tracklaying will commence at the latter point early in the month of June, and will be pushed northward to meet the tracklaying force working in the opposite direction. It is anticipated that a meeting will be effected at or near the Shenandoah Iron Works during the month of September. As the stations, depots, water tanks, etc., are being erected in advance of the tracklaying and as the work all along the line is being vigorously prosecuted, it is probable that the entire line from Hagerstown to Waynesboro' will be completed and in operation during the month of September.

"Very favorable arrangements have been made for a connection with the Cumberland Valley and the Western Maryland railroads at Hagerstown, and for terminal facilities at that point, and with the Chesapeake & Ohio Railroad at Waynesboro'; at Shenandoah Junction is the crossing-point of the Baltimore & Ohio Railroad, and at Riverton a connection is made with the Virginia Midland Railroad. Proper facilities have been provided and business is now being interchanged with these roads. Under a contract with the Western Union Telegraph Company, telegraphic communication has been arranged for all the principal points on the road. The Adams Express Company is also operating under contract with our company; and the United States mails are being carried upon your trains."

Texas & Pacific.—The extension of this road westward toward El Paso is now located through Eastland County, crossing the Leon River at the town of Eastland. The line is said to be a good one, requiring no heavy work, and through an excellent country.

Track is now laid from Ft. Worth westward 21 miles, leaving less than 10 miles to reach Weatherford. At that point there will be a grand celebration when trains begin to run.

Utah Southern Extension.—The track on this road has been laid to Milford, Utah, 24 miles south by west from the late terminus at Black Rock Springs, 107 miles from Juab, where this road begins, and 212 miles from Salt Lake. About 15 miles remain to complete the road to Frisco, which requires some heavy work. Iron to lay the rest of the road is on hand, and a heavy Mogul engine has been received, which is intended to work the grade between Milford and Frisco.

Valley, of Virginia.—A special meeting of stockholders was held in Staunton, Va., May 6, to consider the question of raising money by the issue of mortgage bonds. After some discussion the following resolution, reported by a committee, was unanimously adopted:

"Resolved, That the board of directors be and they are hereby empowered and authorized to issue the bonds of this company in such manner and in such amounts from time to time as said board may deem advisable, to be secured by a trust deed or by trust deeds upon the franchise, effects, assets and property of the company, or, upon such parts thereof as

may be deemed most conducive to the interests of the company, the amount of such bonds not to exceed in the aggregate the sum of \$3,000,000, and the proceeds thereof to be applied to the construction and completion of the Valley Railroad, between Staunton and some point on the Virginia & Tennessee Railroad at or near Salem."

The meeting then adjourned. The intention is to issue bonds on the completed section north of Staunton and use them to build the road to Lexington, then making a further issue to continue it to Salem.

Wabash, St. Louis & Pacific.—A special meeting of stockholders has been called for July 14, to take final action upon several agreements concluded by the board of directors, most of which we have heretofore noted. These agreements are as follows:

An agreement providing for the transfer of the Champlain, Havana & Western Railroad to the Wabash, St. Louis & Pacific Railway Company; such transfer to be by lease or consolidation, as the stockholders of said company may elect.

An agreement providing for the transfer of the Detroit, Butler & St. Louis Railroad to the Wabash, St. Louis & Pacific Railway Company; such transfer to be by lease or consolidation, as the stockholders of said companies may elect.

An agreement providing for the transfer of the Missouri, Iowa & Nebraska Railroad to the Wabash, St. Louis & Pacific Railway Company; such transfer to be by lease or consolidation, as the stockholders of said companies may elect.

An agreement to contract with the Pittsburgh, Cincinnati & St. Louis Railway Company, for the use by the Wabash, St. Louis & Pacific Railway Company of so much of the railway of said company as extends from Logansport, Ind., to the state line between Indiana and Illinois.

Also an agreement providing for an interchange of traffic between the Indianapolis, Decatur & Springfield Railway Company, and the Wabash, St. Louis & Pacific Railway Company.

The agreement for the use of track from Logansport to State Line is for the purpose of securing direct connection with the Toledo, Peoria & Warsaw road, which latter has always used it.

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Grand Trunk.

This company's report for the half-year ending Dec. 31, 1879, covers an average mileage of 1,299½ miles, the system worked from July 1 to Aug. 13 having been 1,390½ miles, and from the latter date 1,272 miles. On Aug. 13 the Riviere du Loup Division, from Chaudiere Curve to Riviere du Loup, 118½ miles, was transferred to the Dominion of Canada to be worked as part of the Intercolonial road.

The comparisons are made with the last half of 1878, when 1,390½ miles were worked for the full half-year. Just at the close of the year the Norway Branch in Maine, 1½ miles, was completed and leased, increasing the mileage to 1,273½ miles.

The earnings, etc., were as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Gross earnings.....	\$278,202	\$224,034	I. \$54,168	5.9
Working exps.....	712,807	708,757	I. 1,050	0.6
Net earnings.....	\$265,395	\$215,277	I. \$50,118	23.3
Interest on Int. Bridge.....	11,836	10,069	I. 1,767	17.2
Total.....	\$277,233	\$225,376	I. \$51,855	23.0
Postal and military bonds not retired.....		626 D.	626	
Net revenue.....	\$277,231	\$224,750	I. \$52,481	23.3
Per cent. of exps.....	72.87	76.70	D. 3.83	5.0

The transfer of the Riviere du Loup Division included the six miles from Chaudiere to Pt. Levis, but the company retained running powers over that section, so that it is included in miles worked, though the full cost of maintenance fall on the Intercolonial.

The increase in passenger receipts was 1.85 per cent., and in freight receipts 9.91 per cent. The traffic carried was as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Passengers.....	1,102,701	1,129,892	D. 27,191	2.4
Tons freight.....	1,407,458	1,146,387	I. 261,071	22.8
Av. receipts per passenger.....	65.25d.	62.50d.	I. 2.75d.	4.4
" per ton.....	109.50d.	122.25d.	D. 12.75d.	10.4

Very low rates prevailed during the first part of the half year. The percentage of expenses to gross earnings was as follows:

	1879.	1878.	Decrease.	P. c.
Maintenance of property.....	29.28	32.61	3.33	10.2
Working the road.....	43.59	44.09	0.50	1.1
Total.....	72.87	76.70	3.83	5.0

The decrease in maintenance was chiefly due to the smaller average mileage worked. The freight traffic was greater, requiring an increase in train mileage and other expenses.

Expenditures on capital account for the half-year were \$38,854.

The income account for the half-year was as follows:

Net revenue as above.....	\$277,231
Interest on lands, Montreal Seminary, Island Pond debentures, etc., less interest received.....	\$0,568
Rentals, Atlantic & St. Lawrence.....	52,540
" Detroit Line.....	1,849
" Montreal & Champlain.....	8,530
" Buffalo & Lake Huron.....	35,000
Interest, equipment bonds.....	27,645
5 per cent. debenture stock.....	69,752
	213,134

Balance.....	\$64,097
Balance from previous account.....	1,043

Total.....\$65,740

Out of this a dividend of 2 per cent. on the first preference stock was paid, requiring \$64,300, and leaving a balance of \$1,430 to the current half-year.

During the half-year four sections of the line between Chicago and Port Huron were bought, and a contract let for building the remaining section. The road, now consolidated and organized as the Chicago & Grand Trunk, is completed and has been opened for freight business, and more recently for local passenger travel.

Great Western, of Canada.

This company's report covers the system of 525.88 miles worked, the Main Line, from Suspension Bridge to Windsor being 229.38 miles; the Loop Line, from Glencoe to Ft. Erie, 145.50 miles; branches owned, 136.17 miles, and leased, 14.83 miles—the last-named being a section of the Welland Railway used to make connection between the Loop Line and Suspension Bridge.

The company also leases the Wellington, Grey & Bruce, 168.35 miles; the London, Huron & Bruce, 68.89 miles, and the Brantford, Norfolk & Port Burwell, 32.40 miles, but the report gives only the net result from these 293.90 miles of road.

The report is for the half-year ending Jan. 31, comparisons being made with the corresponding half of last year.

Charges to capital account for the half-year were \$16,001; new 5 per cent. perpetual debenture stock was placed to the amount of \$10,000. The balance at debit of capital on Jan. 31, was \$7,932.

The income or revenue account was as follows:

	1879-80.	1878-79.	Inc. or Dec.	P. c.
Gross receipts.....	\$461,140	\$393,400	I. \$67,740	17.2
Working expenses.....	281,952	290,322	I. 8,370	8.3
Net earnings.....	\$179,188	\$133,078	I. \$46,110	24.1
Interest on bonds, debenture stock, loss on leased lines.....	99,977	104,626	D. 4,649	4.4
Balance.....	\$79,211	\$28,452	I. \$50,759	178.1
Balance from previous y'r. Dr. 6,260		Cr. 747		
Balance for dividend.....	\$72,951	\$29,199	I. \$43,752	149.8
Percent. w'kn'g exps.....	61.14	63.17	D. 5.03	7.6

From the available surplus of \$92,950 the directors recommend the payment of dividend on the 5 per cent. preference stock for the entire year to January 31, 1880, amounting to \$25,288, and a dividend on the ordinary shares for the half year at the rate of 1½ per cent. per annum, which will absorb \$45,876, leaving a balance to be carried forward of \$1,787.

All descriptions of revenue show an increase except live stock, the decrease on which is due to the prohibition of the transit of American cattle through Canada. Total tonnage was: 1880, 1,041,532; 1879, 813,954; increase, 227,578 tons, or 28 per cent. The average freight rate showed a slight decrease, owing to the very low rates in force at the beginning of the half-year.

The earnings and working expenses per train mile for the last six corresponding half-years compare as follows:

Half years ended Jan. 31.	Earnings, per train mile.	Working expenses excluding reserve and other funds, per train mile.	Per cent. of gross receipts.
1875.....	6 85½	4 11½	74.38
1876.....	5 7	3 11½	70.90
1877.....	4 9	3 8½	78.11
1878.....	5 2½	3 3½	63.19
1879.....	4 11½	3 2½	64.88
1880.....	5 5½	3 4	61.21

During the half-year it was necessary to spend \$2,206 to protect the company's interest in relation to the Detroit River crossing and the Queenston bridge charter; of this \$551—one quarter—is charged in the half-year, the rest to be spread over three half-years.

Payments to the reserve funds have been resumed. The credit balances of the several funds are: Ferry steamers renewal, \$21,469; locomotive renewal, \$118,987; car renewal, \$30,252; rail and bridge renewal, \$32,443; insurance fund, \$2,055. And the balance at debit of leased lines suspense account is \$44,500.

The report says: "The loss on working the leased lines amounts in the half-year to \$11,832, against \$15,462, showing an improvement of \$3,630."

"The sum of \$4,600, being the equivalent of 20 per cent. of the additional traffic interchanged during the half-year with the Wellington, Grey & Bruce Railway, will, under existing agreements, be applied as usual to the acquisition of the bonds of that company, at par, on July 1, 1880."

"The directors have much gratification in reporting, that the working of the Detroit, Grand Haven & Milwaukee Railway Company has been satisfactory. The net revenue from Oct. 19 to Nov. 14, 1878, amounting to \$26,188, has, by arrangement, been credited to the capital account of that company. From November 15, 1878, when the interest on the bonds of the Detroit, Grand Haven & Milwaukee Company commenced, to December 31, 1879, a period of 13½ months, the revenue, after providing for interest on the whole of the bonds guaranteed by this company, and funds for the renewal of permanent way and rolling-stock, exhibits a surplus of \$50,557. This amount, from which a dividend will be payable in respect of the share capital, held by this company, is not available for the past half year."

"A bill submitted by this company to authorize the formation of a superannuation and provident fund for the officers and servants, has received the sanction of the Dominion Legislature. The bills before Parliament promoted by other parties, and affecting the interests of this company, are receiving the attention of your directors. The local government of Ontario has at length expressed an opinion, that the system of subsidies to local lines has been carried far enough, and has refused further pecuniary aid this session. The fact that so many railways already constructed in Ontario, and comprising a large mileage open for traffic, are paying no dividend on their stock, speaks volumes against the policy which has for some years been followed without regard in many cases to public necessity. In conclusion, the directors congratulate the shareholders on the progress the company has made during the half year, and are glad to report that the traffic and rates continue good, and that the Trunk Line companies apparently desire to maintain harmonious arrangements."